thanks for making it a
HILTON-DAVIS
YEAR
SEABOND PIGMENT PRINTING COLORS
OPTICAL BRIGHTENERS
HILTONAPHTHOLS
HILTONIL FAST COLOR BASES
HIDACID ACID DYES
SPECTROSOLS
HILTONE PIGMENT PRINTING COLORS
HIDACO BASIC DYES
HILTOSAL FAST COLOR SALTS
SKYTONE PIGMENT PADDING COLORS
THE HILTON-DAVIS CHEMICAL CO. DIV.
CINCINNATI 13, OHIO
Producers of Finished Colors, Dry Colors and Dyestuffs
Sales Offices, Laboratories and Warehouses
also at Greenville, S. C.
Providence, R. I. • Trenton, N. J.
In Canada, The Canadye Corp.,
Hamilton, Ont.

News about

B.F.Goodrich Chemical *raw materials*

Borg Fabrics, Delavan, Wisconsin, make deep pile fabrics using a backing formulated from Hycar by J. G. Milligan Company, Milwaukee, Wisconsin, adding Carbopol prior to use to produce desired flow properties. B.F.Goodrich Chemical Company supplies Hycar latex and Carbopol water-soluble resin.

Here is the backing that fits the knits

Deep-pile knit constructions are finding an ever-widening market, both in the field of fashion and for industrial uses. One basis for this rapid growth is a backing compound made from Hycar latex and using Carbopol water-soluble resin.

Hycar gives outstanding binding efficiency for deep-pile, yielding a back coating that remains stable under aging. The finished construction has excellent dimensional stability and flexibility. In addition, it is washable and dry cleanable.

The maker of this deep-pile knit uses Carbopol to produce optimum flow properties in the backing formulation. A small amount of Carbopol goes a long way toward eliminating strike-through and preserving desirable hand.

Here's another example of service you can get to produce better textiles for wider appeal, at lower costs. For information, write Department E B-9, B.F.Goodrich Chemical Company, 3135 Euclid Avenue, Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ontario.

PRODUCTS FOR TEXTILE IMPROVEMENT

B.F.Goodrich Chemical Company
a division of The B.F.Goodrich Company

B.F.Goodrich GEON polyvinyl materials • HYCAR rubber and latex • GOOD-RITE chemicals and plasticizers

American Dyestuff Reporter Vol. 48, No. 26 Dec. 28, 1959. Published every other Monday. Printed at Laros Printing Company, P.O. Box 429, Easton, Pennsylvania. Copyright 1959 by Howes Publishing Co., Inc., 44 E. 23rd St., New York 10, N.Y. Domestic subscription $7.50; Canadian, $8.50; Foreign, $18.00. Second Class Postage paid at Easton, Pa.

new way to improve naphthol crock-fastness

DIAZOPON® SS·837

PREVENTS AGGLOMERATION ■ Diazopon SS-837 affords the naphthol dyer outstanding assistance in improving the fastness to crocking of naphthol dyeings. When used in the dyebath, it keeps the dye finely dispersed. This prevents the deposition of excess color on cellulosic fibers, the principal cause of wet and dry crocking. **ACTS AS SOAPING AGENT** ■ The powerful dispersing and solubilizing properties of Diazopon SS-837 make it an excellent soaping agent for naphthol-dyed stock, yarn and fabrics. In yarn dyeing, it eliminates the need for initial warm soaping because it is active at the boiling point of water. ■ Diazopon SS-837 is a nonionic, almost water-clear liquid, readily soluble even in cold water. It is stable to acids, alkalies and metallic ions. ■ Send for a sample of Diazopon SS-837, and see for yourself how it will improve your naphthol dyeings.

gaf gdc ANTARA

From Research to Reality

GENERAL DYESTUFF COMPANY · ANTARA CHEMICALS
SALES DIVISIONS OF GENERAL ANILINE & FILM CORPORATION
435 HUDSON STREET · NEW YORK 14, N. Y.

SALES OFFICES: New York • Providence • Philadelphia • Charlotte • Chattanooga • Chicago
Portland, Ore. • San Francisco • Los Angeles. IN CANADA: Chemical Developments of Canada, Ltd., Montreal

Diazopon SS-837, manufactured by General Aniline & Film Corp., is sold outside U.S. & Canada under the trade name of "Iguafen® SS-837" by distributors all over the world.

RESLOOM, STYMER, LYTRON: REG. U. S. PAT. OFF.

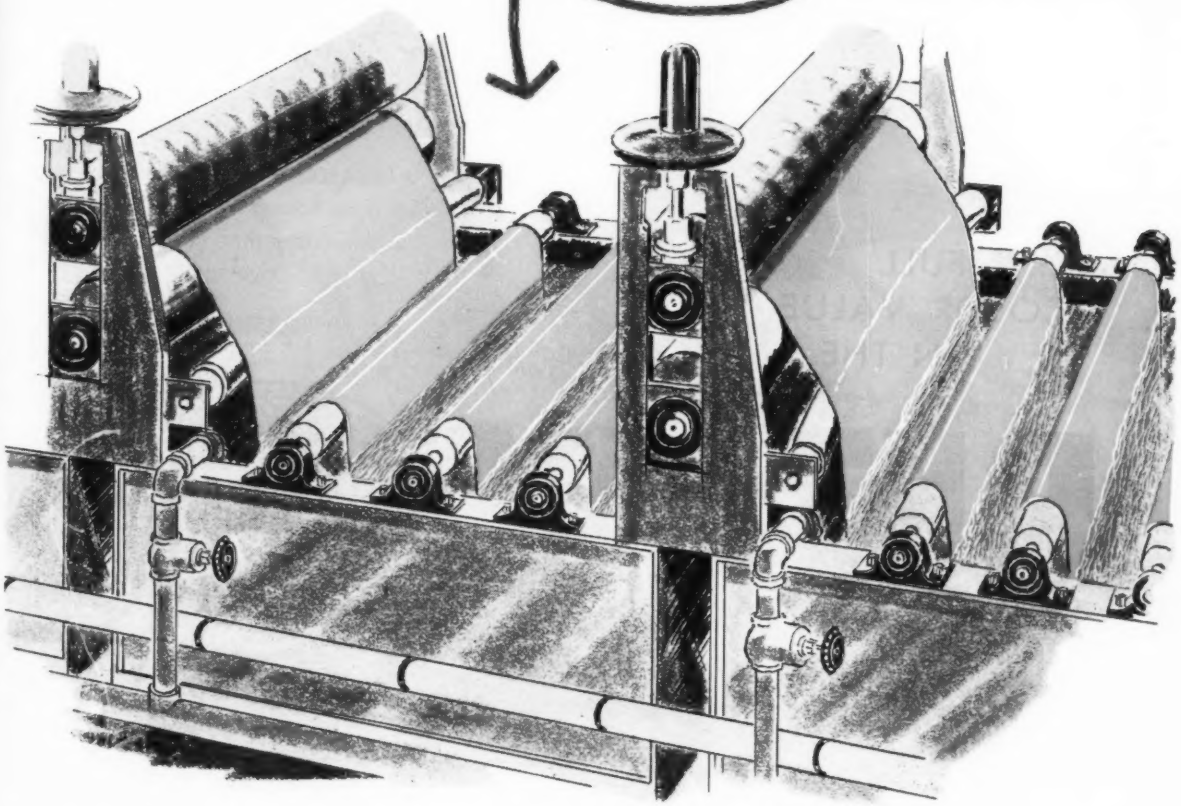
the frugal finisher's friend: "AC" catalysts

Here's how Monsanto AC Catalysts give you better results for less: 1) longer resin bath life; 2) faster, more complete curing of melamine, urea and other thermosetting resins; 3) with minimum resin add-on. There's less danger of amine odor formation or residual formaldehyde. And AC Catalysts are compatible with practically all modifying agents. Keep your finishing costs down—*safely*—with AC Catalysts and other Monsanto textile chemicals. For complete technical data on AC catalysts, write Monsanto Chemical Company, Plastics Division, Room 712, Springfield 2, Massachusetts.

Monsanto

Other outstanding Monsanto textile chemicals include: Resloom E-63 chlorine resistant resins; Resloom E-50 cyclic urea resin; Resloom HP and M-75 melamine resins; Stymer sizes; Lytron polystyrene latices

for a better job **HERE**



Soap off thoroughly, economically

SYNTHRAPOL SP

SYNTHRAPOL SP for soaping off after dyeing or printing does a highly efficient all-around job!

For fiber reactive dyeings and prints – SYNTHRAPOL SP removes unfixed dye, residual alkali, electrolyte. Promotes high wet fastness.

SYNTHRAPOL SP used in the soaping of vat or azoic dyeings or prints improves brightness of shade, minimizes crocking.

SYNTHRAPOL SP works well in hard or soft water.

Synthrapol Reg. Trade Mark

Ask for sample or further technical information.

Quality AHCO PRODUCTS Integrity

ARNOLD, HOFFMAN & CO., INCORPORATED

55 Canal Street, Providence, Rhode Island • Est. 1815

A Subsidiary of Imperial Chemical Industries Limited, England

West Coast Representative: Chemical Manufacturing Company, Incorporated of California

ICI

419-9

RETARDINE controls dyeing action by spreading out the dye's exhaustion period. You get level dyeing action every time and, with it, maximum color value in the goods.

Use **RETARDINE REGULAR** for controlling dyes having normal, or slightly-faster-than-normal, dyeing action,

FOR
FULL
COLOR VALUE
IN THE FABRIC—

RETARDINE

RETARDINE D

and **RETARDINE D** for controlling dyes having a very fast dyeing action. Both Retardines are quality-controlled to give uniform results, batch after batch.

Test Samples and Technical Information on Request.

STANDARD CHEMICAL PRODUCTS INC.
HOBOKEN, N. J. • CHARLOTTE, N. C.

Photo courtesy Burlington House Fabric Company, New York, N. Y.

Smart new way to cover a market

Fabrics with high fashion appeal have never been used for mattress coverings before–and with good reason. Attractive materials like rayon damask simply couldn't take the pull and strain of a tufted mattress.

Now, thanks to PLIOLITE LATEX, a smart-looking line of rayon damask mattress coverings has been created that not only calls for customer attention–*but lasts longer, too.* That's because a coating, based on PLIOLITE LATEX, provides the necessary adhesion to hold warp and filling threads in place–gives the fabric better body, improves seam strength. And because this latex is easy to process–with excellent mechanical stability–the production operation is efficient and economical.

Want more information? Simply write for details on PLIOLITE LATEX – including latest *Tech Book Bulletins*–to

Goodyear, Chemical Division,
Dept. L-9410, Akron 16, Ohio.

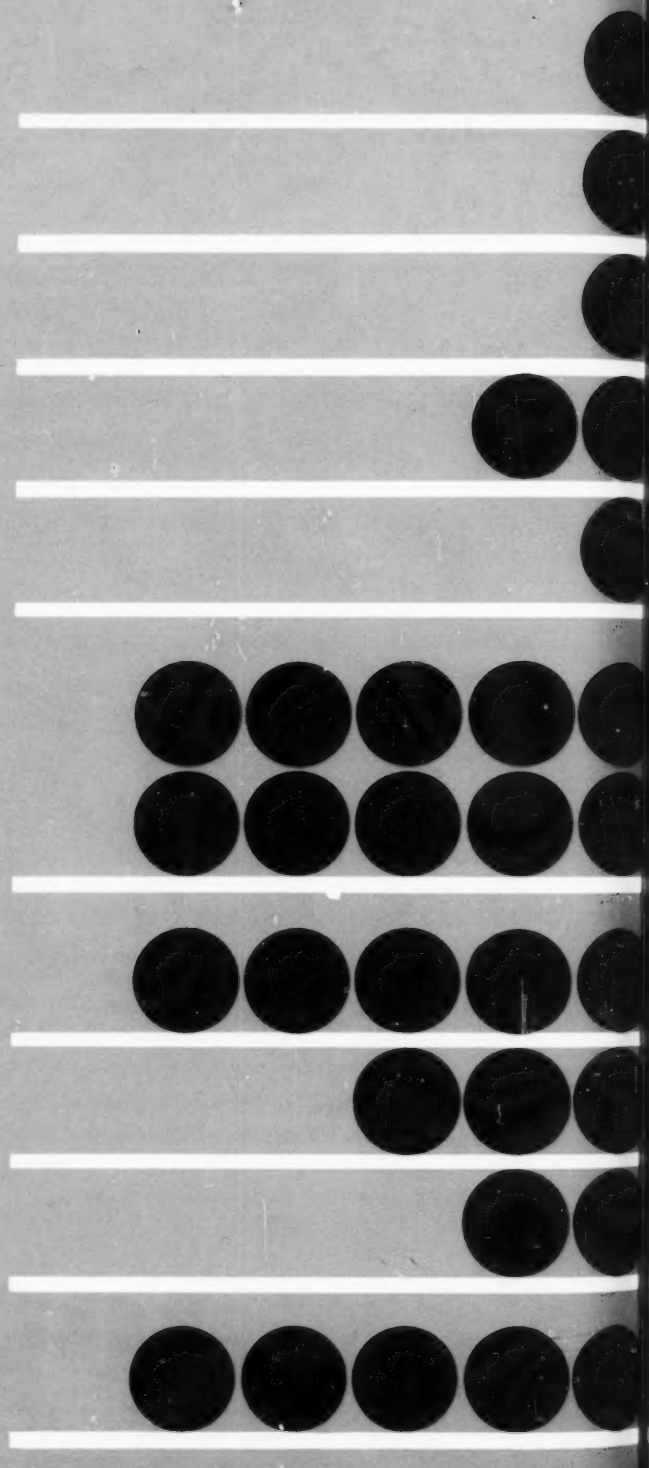
GOODYEAR
CHEMICAL DIVISION

Pliolite–T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

PROGRESS REPORT

1959

Again in 1959... CIBA product development has led to the introduction of more new dyes and important additions to the growing range of CIBA Chemical Specialties than in any equivalent twelve month period in our history. This impressively demonstrates our confidence in the bright and growing future of the textile and allied trades.



rlene* (Basic)	Deorlene Brilliant Red 4G
d	Neonyl* Black JT
alan*	Cibalan Bordeaux EL
lan*	Neolan Leather Brown G Neolan Black WAN Ex. Conc.
nal*	Oxanal Fast Grey GLS
anone*	Cibanone Dark Blue MBA Paste Cibanone Olive 2RM Double Paste Cibanone Printing Black TR Double Paste Cibanone Olive 2BD Double Paste Cibanone Olive 2BM Double Paste Cibanone Brown BF Double Paste Cibanone Red Brown RB Double Paste Cibanone Black 2BN Double Paste Cibanone Black 2BD Double Paste Cibanone Black DPN Double Paste
acete*	Cibacete Yellow GWN Cibacete Turquoise Blue 4G Cibacete Dark Blue RB Conc. Cibacete Navy Blue RL Conc. Cibacete Blue DBL
acron*	Cibacron Violet 2R Cibacron Brilliant Blue BR Cibacron Brown 3GR
acrolan*	Cibacrolan Blue 8G Cibacrolan Green VM
mical cialties	Phobotex* FTC Uvitex* ERN Conc. Univadine* W Albatex* HW Disperser CC

red Trade Mark

FORECAST

1960

New ideas, further improvements, to serve the practical needs of the progressive dyer and finisher while stimulating the designer to new creative achievements in the imaginative use of color, are fundamental to CIBA's development program for the year ahead.

CIBA WHERE RESEARCH IS THE TRADITION

EXETER HAS BENEFITED BY SUN CHEMICAL CORPORATION WARWICK CHEMICAL KNOW–HOW

Outstanding fabric finishing has been the foundation of Exeter Manufacturing Company's success since 1827.

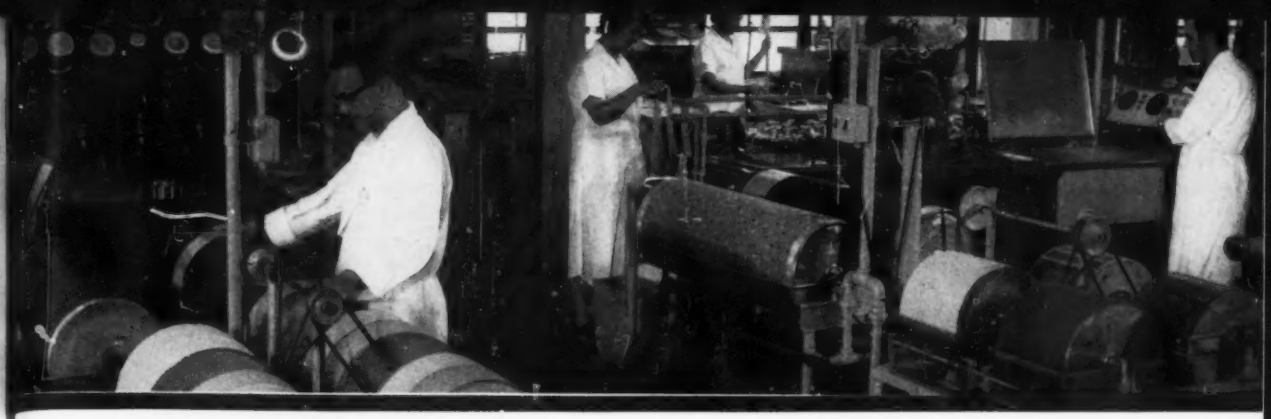
With Warwick Chemical's new **IMPREGNOLE FH®**– Exeter maintains their tradition of superior finishing. The dependable water repellency which the textile industry has associated with **IMPREGNOLE®** since 1929 is now further enhanced with the new and long sought after characteristic of "*Controlled Hand*". **IMPREGNOLE FH** makes this possible because it is fully compatible with polyvinyl acetate, thermo-setting resins and other builders. New **IMPREGNOLE FH** requires no curing and yet is durably resistant to soiling and spots and stains, and can be applied to any fabric in any finishing plant.

Wash-and-wear . . . rain wear . . . drapery fabrics . . . wherever your finishing problems arise, Warwick experts are ready and willing to help you. And – with the vast resources of the Sun Chemical Corporation to aid our operation – we are fully equipped to do the job. Take advantage of Warwick know how and **IMPREGNOLE FH.** Call your Warwick Chemical counselor. We look forward to hearing from you . . . for *your problems are Warwick's business.* Our phone number is YUkon 6-5500.

This in capsule is Warwick Chemical– People, Skills, Equipment, Know-How... but especially People

Sun

Warwick Chemical Division
SUN CHEMICAL CORPORATION
750 Third Ave. at 46 St., New York 17, N. Y.



Althouse Sales Service Laboratory

Give your products every competitive advantage!

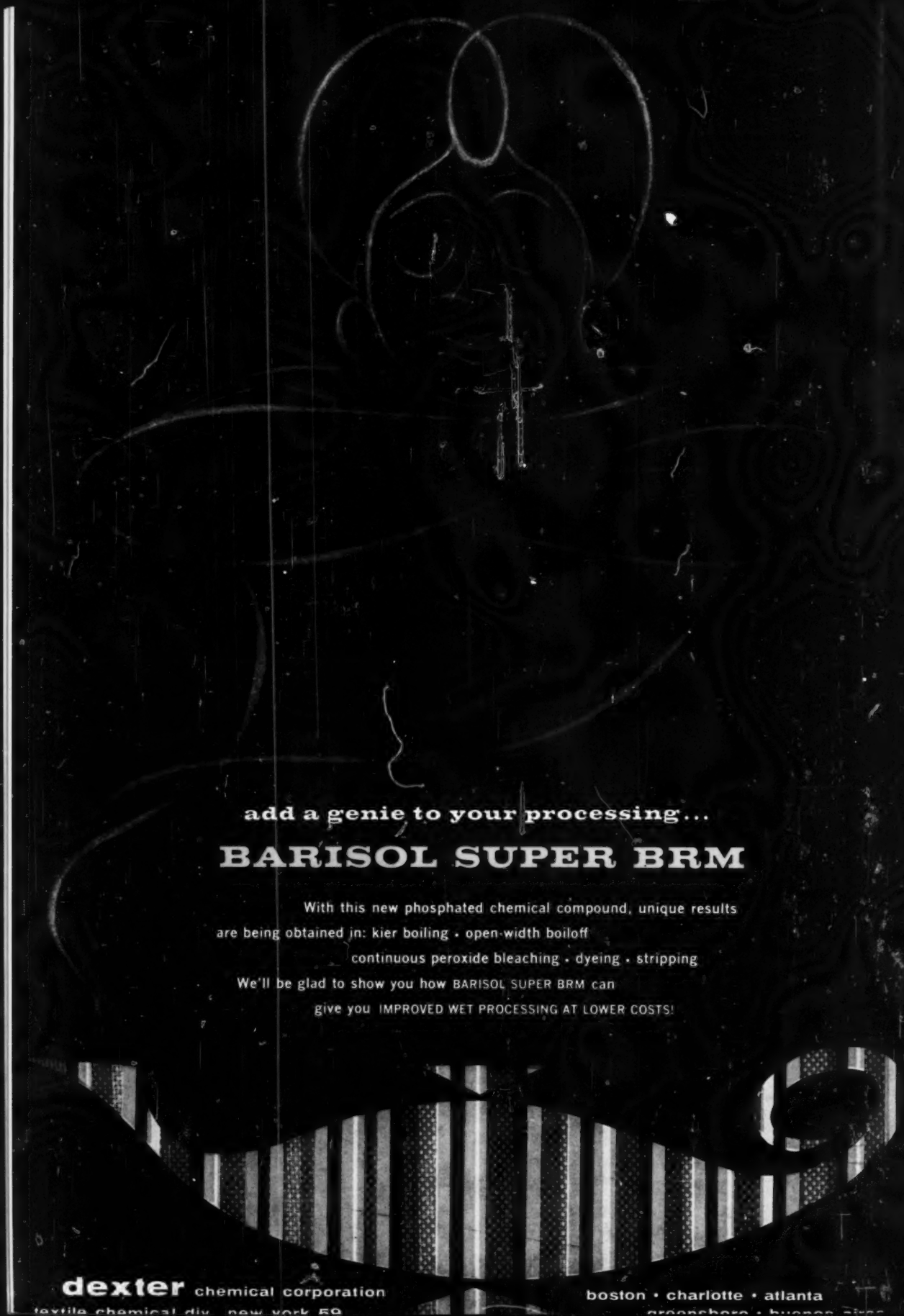
In addition to good design, today's market demands true **colorfastness**—obtainable when you specify Althouse dyes. Extensive research plus application experience provide a background of knowledge that has enabled Althouse dye-making specialists to set new standards of quality and uniformity. Send your color problems to Althouse customer service lab today.

Althouse Chemical Company, Reading, Pa.
a division of Crompton & Knowles Corp.

ALTHOUSE colorfast dyes

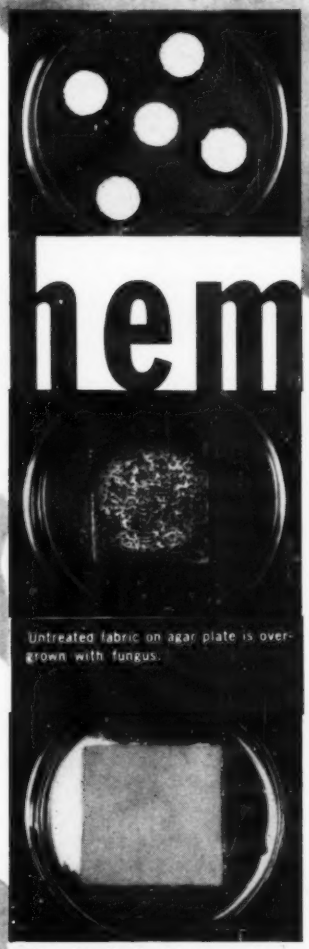
pace-setter for the industry

Superlitefasts
Nylanthrenes
Sol-aqua-fast
Supernylites
Nydyes


add a genie to your processing...
BARISOL SUPER BRM
With this new phosphated chemical compound, unique results
are being obtained in: kier boiling • open-width boiloff
continuous peroxide bleaching • dyeing • stripping
We'll be glad to show you how BARISOL SUPER BRM can
give you IMPROVED WET PROCESSING AT LOWER COSTS!
dexter chemical corporation
textile chemical div., new york 59
boston • charlotte • atlanta

HARTEX

permachem®



Four outer Permachem treated cloth discs on agar plate have prevented bacterial growth around them. Center, untreated disc permits germ growth.

Untreated fabric on agar plate is overgrown with fungus.

Permachem treated fabric exposed and incubated the same as center fabric, shows no fungus growth.

VIRTUALLY 100% EFFECTIVE AGAINST ODOR-CAUSING BACTERIA

Fabrics impregnated with Permachem have durable resistance to odor- and disease-producing bacteria, *and* to mold and mildew caused by fungi. Permachem kills these bacteria and fungi on contact.

Impregnation is a simple, inexpensive padding, dye-beck or spraying process, requiring no special skills or extra equipment. Permachem clings so well to the fiber and is so stable that it withstands repeated launderings, dry-cleanings, weather exposure and extremes of temperature such as those of autoclaving.

See your Hart representative and discover how to increase product sales value and durability with Permachem.

the Hart Products Corporation

1440 BROADWAY, NEW YORK 18, N. Y.

Works and Laboratories, Jersey City, N. J.

Hart Products Company of Canada, Ltd., Guelph, Ontario

HART PRODUCTS — PATED ON RESEARCH

PERMACHEM is manufactured by Permachem Corporation, West Palm Beach, Florida.

HARSHAW

Zinc Nitrate Flake

Readily Soluble
High Purity
Less Fines
Easy to Handle

Harshaw Zinc Nitrate Flake is especially suited for polymerizing resins currently being used for wrinkle-free and wash-and-wear fabrics.

Harshaw Zinc Nitrate Flake is produced under rigid control assuring the user of uniform resin catalysis at all times.

Harshaw Zinc Nitrate Flake measures about 3/32" thick by 1/2" long, thereby reducing dust and fines to absolute minumum.

Packed in 300 or 100 pound Leverpak drums with polyethylene liner, Harshaw Zinc Nitrate Flake is available for immediate shipment. Write for samples and prices.

TYPICAL AVERAGE ANALYSIS:

Zn	25.20%
Fe	0.001%
Pb	0.005%
H_2O Insoluble	.008%
pH of 5% solution	5.1

HARSHAW

THE HARSHAW CHEMICAL CO.

1945 E. 97th Street, Cleveland 6, Ohio

CHICAGO • CINCINNATI • CLEVELAND • DETROIT • HASTINGS-ON-HUDSON, N. Y.
HOUSTON • LOS ANGELES • PHILADELPHIA • PITTSBURGH

Sandopan DTC delivers the goods... cleaner!

This SANDOZ crypto-anionic detergent has proved itself...

unsurpassed for preparing

cottons nylon

viscose and acetate fabrics

all the newer man-made fibers

unsurpassed for production

processes which require

better whites

more absorbent goods

and is the prime choice

in preparing goods for resin work.

For the facts, see our 40 page brochure, Sandopan DTC. Write, wire, or 'phone SANDOZ, INC., 61-63 Van Dam Street, New York 13, New York. ALgonquin 5-1700

District Offices: Charlotte, Cincinnati, Fair Lawn, N.J., Hudson, Mass., Los Angeles, Philadelphia.

SANDOZ

THINKS AHEAD WITH TEXTILES

SANDOZ

AMERICAN TEXTILE MACHINERY EXHIBITION

ATLANTIC CITY, N.J. MAY 23 TO 27 WILL BE COVERED IN THE MAY 16, 1960 ISSUE OF

AMERICAN DYESTUFF REPORTER

•

Copies will be distributed from our booth to those interested in world-wide developments of machinery specifically designed for the wet-processing industry.

•

Advertising placed in this most important issue will reach a large group of readers as this is the first International Textile Machinery Exhibition ever held in the U.S.A. ON AN INTERNATIONAL SCALE

Howes Publishing Company
44 E. 23d Street, New York (10) N.Y.

Speaking of Softness...

whichever you choose, you're right – when you specify

POLY-IONIC SOFTENERS

for cottons and synthetics!

POLY-IONIC N
(NON-IONIC)

produces a soft, full hand with exceptional drape.
non-chlorine retentive — does not yellow white fabrics even at elevated temperatures
— miscible with resins and most other finishes

POLY-IONIC C
(CATIONIC)

for greater surface lubrication

POLY-IONIC A
(ANIONIC)

for a softer and dryer hand

ALL THREE POLY-IONIC Softeners give cottons and synthetics a FULL and PLEASING hand, with these additional benefits!

- **better crease recovery, better abrasion resistance**
- **surface lubrication that reduces wear**
- **excellent inter-fiber lubrication for better sewability to reduce needle cutting**
- **increased tensile and tear strength**
- **resistance to high temperature curing and ironing**
- **good durability to washing when used in resin bath**

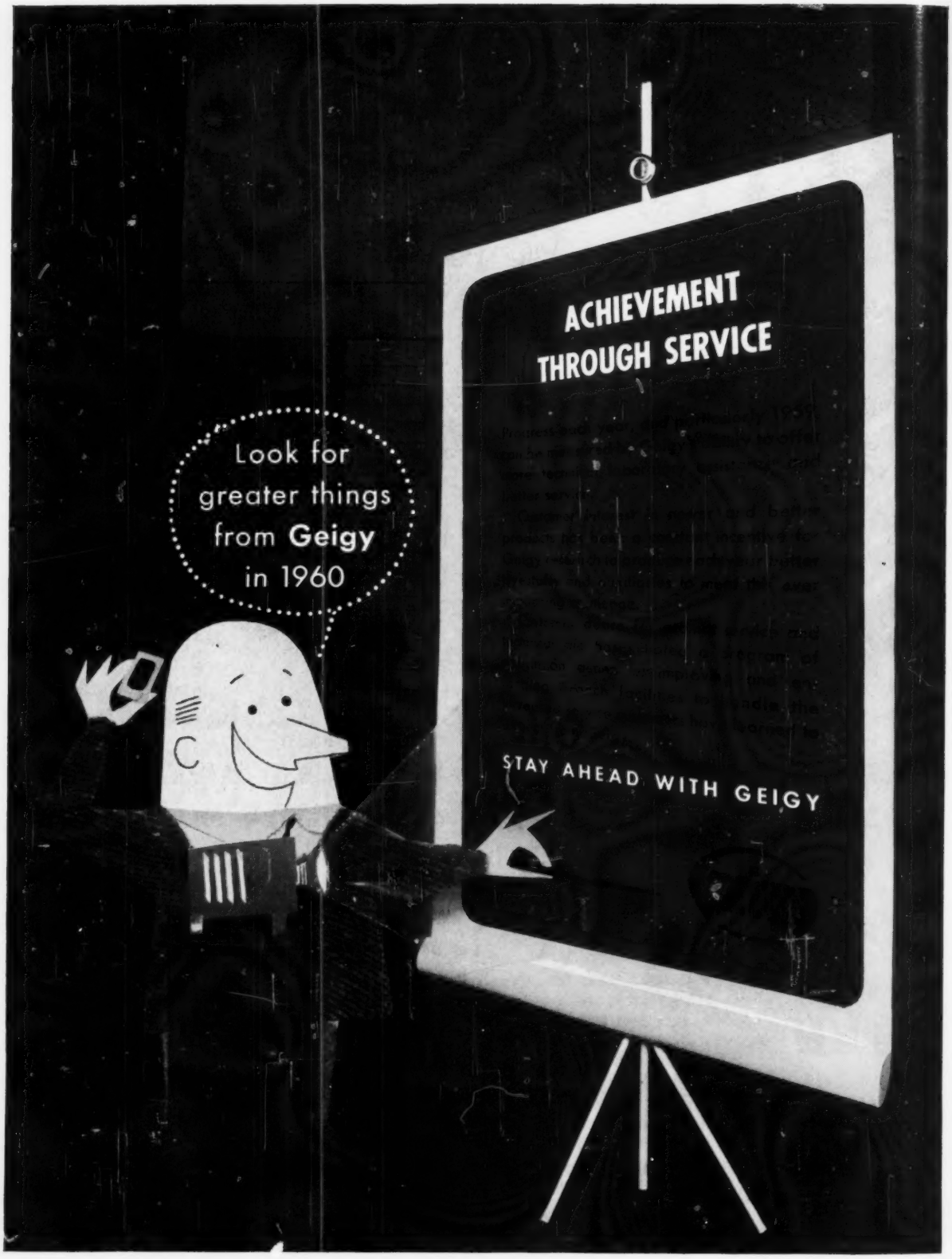
POLY-IONIC Softeners are polyethylene emulsions, compatible with thermo-setting resins. They disperse readily in the bath and apply easily on a padder.

The three types — Non-ionic, Cationic and Anionic — offer you a range of outstanding softeners to meet your specific needs.

Write for Technical Bulletin and samples

ARKANSAS CO., INC. AC INC. NEWARK, NEW JERSEY

Serving the Textile Industry for over 55 Years



Geigy Dyestuffs Division of Geigy Chemical Corporation,
Saw Mill River Road, Ardsley, New York

Branches: Charlotte, Chattanooga, Chicago, Los Angeles, Newton Upper Falls, Philadelphia, Portland

NORMAN A. JOHNSON
Editor

CHARLES A. WHITEHEAD
Managing Editor

MYRON D. REESER
Business Manager

HERBERT A. STAUDERMAN
Advertising Manager

WILLIAM J. O'CONNOR
Production Manager

BERYL A. LAKNER
Circulation Manager

OFFICIAL PUBLICATION OF THE PROCEEDINGS, AMERICAN ASSOCIATION OF TEXTILE CHEMISTS AND COLORISTS

American Dyestuff Reporter was founded in 1917 and the Textile Colorist and Converter (formerly Textile Colorist) was incorporated with it in January, 1949. Published every other Monday, by the **HOWES PUBLISHING COMPANY, INC.**, 44 East 23rd Street, New York 10, N. Y. **C. R. Howes**, President; **Ernest J. Finan**, Executive Vice-President; **Norman A. Johnson**, Vice-President & Treasurer; **Myron D. Reeser**, Vice-President; **Clara Patrick**, Secretary.

Telephone SPring 7-9364

AMERICAN
DYESTUFF REPORTER

DEVOTED TO TEXTILE WET-PROCESSING

contents

VOLUME 48 December 28, 1959 NUMBER 26

special articles

Identification of Unknown Synthetic Fibers. Part III —Revision and Application of Micro Fusion 23
Sidney G Smith

Index to Volume 48 43

aatcc proceedings

A Study of the Removal of Metal Ions from Cotton Fabrics 27
Rhode Island Section

Obituary—Raymond W Jacoby 37

AATCC Calendar 37

AATCC Deceased 37

Future Papers 38

Elected to Membership 38

Activities of the Local Sections 39

departments

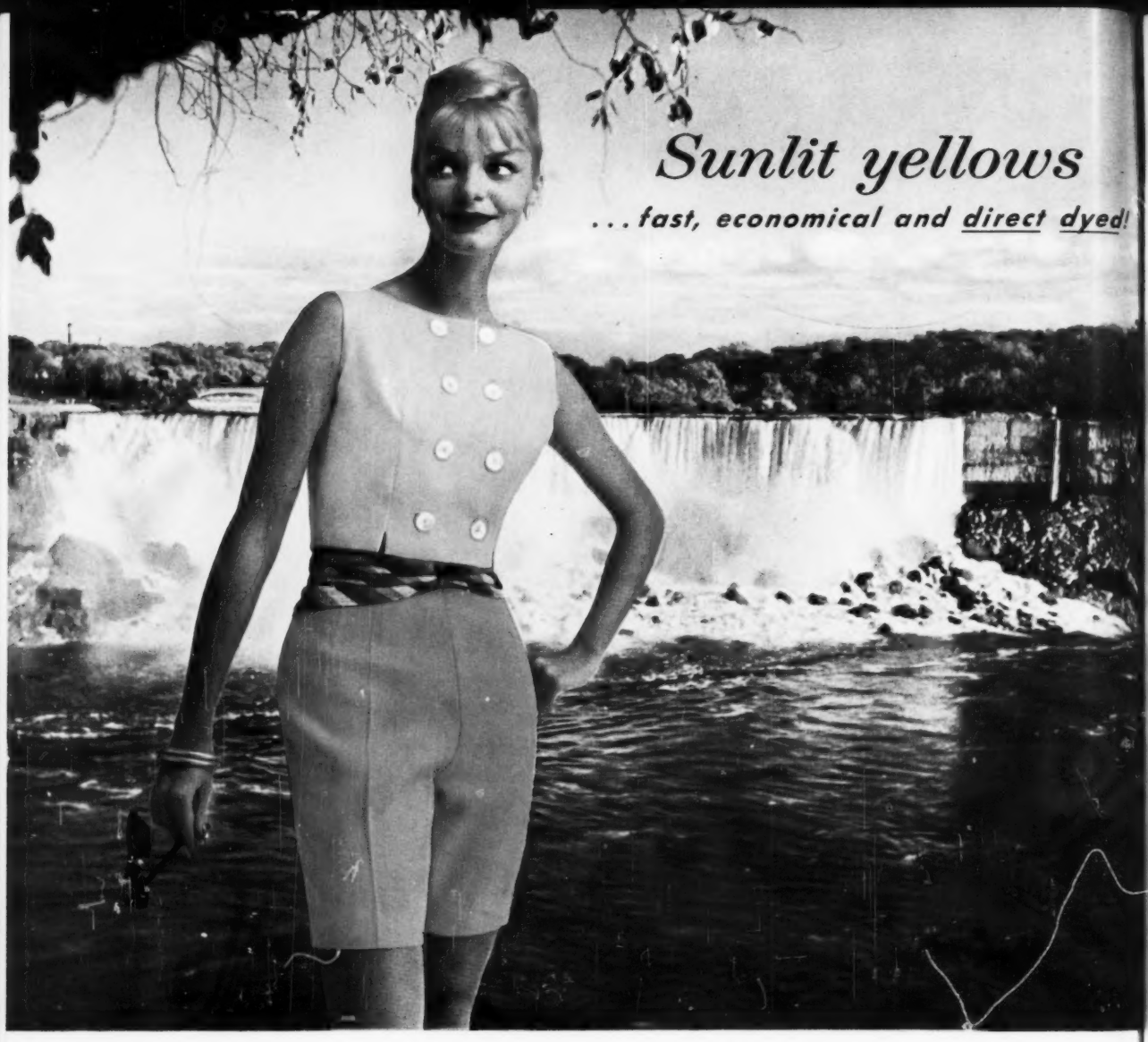
Inter Alia-Inter Nos 41
P J Wood

News of the Trade 52

Names in the News 56

Copyright, 1959, Howes Publishing Co, Inc

Contents of previous issues can be found by consulting the Service and Technology Index and the Engineering Index, at your Library



Designed for America at play
by Melba Hobson
of Mr. Gee Sportswear

Here's a versatile range of bright yellows to meet a variety of dyeing and printing requirements.

All produce very good light fastness . . . especially in pastels . . . and better-than-average wash fastness by the direct process or with a simple aftertreatment.

These outstanding dyes are American-made and strictly standardized for dependably consistent results.

Our nearest office will supply bulletins, samples and suggested formulations to match your shades.

ERIEFORM YELLOW GR
ERIE FAST YELLOW WB
SOLANTINE YELLOW FF Conc
SOLANTINE YELLOW RL

NATIONAL ANILINE DIVISION
40 RECTOR STREET, NEW YORK 6, N. Y.
Atlanta Boston Charlotte Chicago Greensboro Los Angeles
Philadelphia Portland, Ore. Providence San Francisco
In Canada: ALLIED CHEMICAL CANADA, LTD., 100 North Queen St., Toronto 18
Distributors throughout the world. For information:
ALLIED CHEMICAL INTERNATIONAL • 40 Rector St., New York 6, N. Y.

Allied Chemical

AMERICAN

DYESTUFF REPORTER

Volume 48 December 28, 1959 No. 26

IDENTIFICATION OF UNKNOWN SYNTHETIC FIBERS
Part III—Revision and Application of Micro Fusion

SIDNEY G SMITH

Plant Chemist, Security Mills Inc

Newton, Mass

Parts I and II under the general title, "Identification of Unknown Synthetic Fibers" (*1, 2*), described data relating to the qualitative analysis of man-made fibers by light microscopy.

This paper is a revision which includes the latest fibers, and utilizes the method of micro fusion in addition to observations of fiber morphology, behavior under polarized light, optic sign, refractive index and solubility.

A systematic method is presented for the identification of twenty-five synthetic fibers by group separation and confirmatory tests.

INTRODUCTION

SINCE the publication of Parts I and II, (*1, 2*) new fibers have appeared and made necessary a revision of the analytical procedure. Micro fusion is a potent technique, and its application to the analysis of unknowns is presented in this paper.

The most generally useful analytical methods are those which are simplest, and require common inexpensive laboratory apparatus. These conditions were possible some twenty years ago, when the analyst had relatively few man-made fibers to deal with. Simple microscopical and solubility tests were about all that were necessary for indentification.

Such is not the situation today, when advancing technology has expanded the spectrum of synthetics so broadly that the analyst now faces many fibers, and even many in the same generic group. See Table I.

This has made necessary the use of somewhat elegant methods, and specialized instrumentation in the formidable problem of identifying unkowns. New fibers will continue to appear, and the problem will become even more complex.

Methods utilized in this paper involve the following observations: cross section, longitudinal appearance in ordinary and polarized light, optic sign, refractive index, micro fusion and solubility.

Instrumentation required includes a microtome, good microscope lamp, polarizing microscope with a first order red retardation plate and a Kofler hot stage. Adaptation of simpler equipment is possible (*1, 2*), but by no means as desirable for best work. Techniques used also have been described (*1, 2*).

DISCUSSION

If the sample is a monofilament, or coarse denier, its polarization color may be obscured. The thickness can reduce the transparency, and the "order" of the colors increases as a function of thickness, even though the birefringence remains constant. The higher order colors are pale and weak. In order to overcome this, the end of the fiber may be wedge cut to a very thin taper (*3*). When examined under crossed polarizers, vivid polarization colors will show if the sample is highly birefringent. End wedge cuts are very simply accomplished by diagonal slicing with a razor blade. Cutting small slivers is an alternative way of reducing fiber thickness. Becke Line observations may be made on the thin portion, or sliver, and this technique is sometimes helpful in observations of heavily dyed fibers.

Caution must be exercised in the interpretation of fiber visibility, as heavily dyed fibers may appear more visible than they normally would.

Testing for solubility in hot acetone is recommended as a diagnostic test for fibers spun from this solvent.

Micro fusion points provide highly useful criteria in the identification of synthetic fibers. Among the fibers considered, the fusion points are far enough apart to confirm identity. The application of micro fusion follows the method described by Grabar and Haessly (*4*). General information on micro fusion and Kofler hot-stage techniques may be found in the literature (*5,6,7,8*). A commercially obtained Kofler hot stage was used to obtain the data presented in this paper.

The terms "micro fusion" and "micro melting point" are synonymous and refer to that temperature at which a fiber becomes isotropic, or nearly so, and fuses or melts. The point of fusion is a fundamental property of the molecular structure and may be abrupt and sharp, or proceed over a range of degrees. In this work there has been no attempt at taking the appearance of first order gray, or isotropy, as the start of a melting range, or as an analytical point for fibers that do not melt. Reasons for this are that many fibers which do not melt possess only low first-order gray or silver birefringence to begin with, dyes may interfere and dull fibers may be difficult to interpret.

However, the fibers are examined under crossed polarizers, because the change in polarization color and the approach of isotropy is indicative of the approach of fusion. Alternating between crossed and uncrossed polarizers is desirable.

The fusion values reported in this paper are those observed at the start of true fusion. This is generally observed as the melting and fusing together of fibers lying across each other, the fusing taking place at their cross-over points.

TABLE I
Trade and generic names

Trade name	*Generic name*
acetate	acetate
Acrilan	acrylic
alginate	alginate
Arnel	triacetate
Corval	rayon
Creslan	acrylic
Dacron	polyester
Darvan	nytril
Dynel	modacrylic
Fortisan	rayon
Kodel	polyester
nylon 66	nylon
nylon 6	nylon
Orlon	acrylic
polyethylene	olefin
polypropylene	olefin
rayon	rayon
Rhovyl	vinyon
saran	saran
Topel	rayon
Verel	modacrylic
Vicara	azlon
Vinal 5F	vinal
Vycron P23	polyester
Zefran	acrylic

Fibers may shrink very slowly during heating, or may shrink abruptly at, or near, the fusion point. The magnitude of shrinkage varies greatly among the different generic types. Certain fibers, such as Rhovyl 55, are designed to shrink a large amount during processing, and therefore exhibit high shrinkage at low temperatures well below fusion. If this occurs with an unknown, it may be desirable to start again using fibers considerably longer than usual.

Darvan and Vinal 5F (*9*) show abrupt high shrinkage at fairly high temperatures, which serve as useful analytical criteria, even though they do not fuse. The polyesters, polyamides and polyolefins, which are microscopically similar, may be individually identified by their micro fusion points.

Heating must be carefully controlled, and the values reported here were obtained at a rate of rise of approximately 3°C/min. Voltage settings, Table IV, are given only as a guide, because transformers vary due to differences in winding etc.

The fibers were cut to short lengths of approx one mm, mounted in Dow Corning 710 Fluid and covered with a cover glass (*4*). Mounting in a silicone oil excludes air, and therefore melting behavior may be quite different from that obtained in air by various macro methods. More easily observed and reproducible fusion points are obtained more readily by the micro method in silicone oil than by other methods (*4*).

Observations were made at a magnification of X100. A X10 objective with a working distance greater than six mm must be used because of the distance from the specimen to the top glass cover of the hot stage (*6*). Placing a thin sheet of appropriately drilled transite between the microscope stage and hot stage, in order to minimize heat transfer to the substage parts, is recommended even in the case of microscopes with metal stages.

Depending upon the light source and type of substage condenser, it may be necessary to use the concave side of the substage mirror when the top element of the substage condenser is swung out, in order to achieve satisfactory illumination.

Some of the material in the Procedure is repetitive and overlapping. This is intentional, as the author has intended to provide as much useful data as possible.

The steps in the Procedure are meant to be followed in sequence, as success depends upon fibers being identified and eliminated in the proper place. However, short-cutting is possible, depending upon the nature of the unknown and the experience of the analyst.

TABLE II
Fibers by cross section*

Round, or nearly so
- Acrilan, 6 d/f and higher may be bean shaped
- Creslan, some show mix of round, bean, squat dogbone
- Dacron
- Fortisan 36
- Kodel
- nylon 66 and 6
- polyethylene, may also be special shapes
- polypropylene, may also be special shapes
- Rhovyl, some with one, or both sides slightly indented
- saran, may also be special shapes
- Vicara, high deniers may be elliptical to bean shape
- Vycron P23
- Zefran

Lobed
- acetate
- Arnel, more serrated than acetate
- Fortisan, regular

Serrated
- Corval
- rayon (viscose), some types special shapes
- Topel

Dogbone
- Orlon, all except Type 21 whose most characteristic shape is a compressed dogbone with one end mushroomed out, along with some irregular lobed.
- Verel

Multiform
- Alginate, sharply serrated or branched, irregular, elongated.
- Darvan, half doughnut to elongated string bean, characteristic are some string bean showing one side with a round lump at center.
- Dynel, irregular cruller-like to Y shapes, to closed half doughnut.
- Vinal 5F, elongated string bean to horseshoe with pronounced skin-core effect.

*In longitudinal view the fibers with round cross sections appear rod-like. The lobed, serrated, dogbone and multiform fibers appear striated, or show twists or contour lines.

The identification of Acrilan, Creslan, and Zefran presents some difficulty. They are positively identified as acrylic fibers, but not readily as individuals. Therefore, data on their behavior in anisole is given, and close comparison with knowns should be made. Part I (*1*) listed data relating to the degradation of Creslan in 50% zinc chloride on a water bath 20 minutes, with subsequent passage through the holes of a #4 Gooch crucible. Recent samples of various deniers of Creslan were not degraded by this treatment, and therefore, this test has been eliminated from the Procedure.

Although it was the intention of the author to avoid staining tests, a test for Fiber X-51 utilizing a saturated solution of Rhodamine B in benzene, and described by Feigl et al (*14*), was tried on Creslan and its forerunner, X-51. This test produced the positive fluorescent red on X-51, but was negative on Creslan.

Darvan X-7 has the same appearance and micro behavior as regular Darvan. The same is true of Orlons 42 and 25, filament Orlon 82 and Dacrons 54 and 64. The latter two also have the same micro fusion point. Type 21 Orlon has a different cross section than the other Orlons.

PROCEDURE

All observations were made using a Bausch & Lomb blue daylight filter and neutral tint filters.

Compare with knowns whenever necessary.

Prepare a cross section and refer to Table II.

Prepare a longitudinal mount in colorless mineral oil, n = 1.470, and observe fiber morphology. Refer to Table II.

Using this slide, determine the magnitude of birefringence in the 45-degree position under crossed polarizers, and the optic sign by means of the first order red plate. Refer to Table III.

Mount in Dow-Corning 710 Fluid and, using the Kofler hot stage, determine the micro fusion point, or that the fiber does not fuse. Refer to Table IV.

GROUP SEPARATION

GROUP 1———Mount in colorless mineral oil, n = 1.470, (slide from above) and examine in the 45-degree position under crossed polarizers. Fibers that show polarization colors: Corval, Dacron, Fortisan, Kodel, nylon 66 and 6, polyethylene, polypropylene, viscose rayon, Topel, Vycron.

Vinal 5F may show colors at the twists, but at wide part is silver gray to yellow.

All other fibers, in all groups, show only low order gray to silver because of low birefringence. Some very dark shades, and some blacks, may render the fiber so opaque that the polarization colors are obscured. Retain slide for Group 3 examination.

GROUP 2———Mount in 1-bromonaphthalene, n = 1.657, and examine parallel. Becke Line moves toward fiber: Dacron, Vycron.

GROUP 3———Mount in mineral oil, n = 1.470, and examine parallel. Fiber is only faintly visible: acetate, Arnel, Darvan.

Mount in toluene, n = 1.496 and examine parallel or perpendicular. Becke Line moves toward liquid: acetate, Arnel, Darvan. In mineral oil, all other fibers in all groups are visible, and in toluene they all have Becke Lines that move toward the fiber both parallel and perpendicular.

GROUP 4———Mount in monochlorobenzene, n = 1.522.

a) Examine parallel. Fiber is only faintly visible. Becke Line

TABLE III
Fibers by optic sign and birefringence

Positive optic sign	*Birefringence, crossed polarizers, 45°*
acetate	low—gray
alginate	" "
Corval	high—colors
Dacron	" "
Dynel	low—gray
Fortisan	high—colors
Kodel	" "
nylon 66 and 6	" "
polyethylene	" "
polypropylene	" "
rayon, viscose	" "
Rhovyl	low—gray
Topel	high—colors
Vicara	low—gray
Vinal 5F	low—gray to yellow, may show colors at twists
Vycron P23	high—colors
Negative optic sign	
Acrilan	low-gray
Creslan	" "
Darvan	" "
Orlon	" "
saran	low—whitish yellow
Verel	low—gray
Zefran	" "
Isotropic (practically)	
Arnel	invisible

TABLE IV
Fibers by micro fusion point

FIBERS THAT FUSE (MELT)

Transformer voltage setting	*Fusion point (°C)*	*Fiber*
35	126 - 135	polyethylene, high density, linear
37	165 - 166	polypropylene, isotactic
40	174 - 176	saran, polyvinylidene chloride
45	206 - 208	Rhovyl 55, polyvinyl chloride
45	224	nylon 6, polyamide
47	238	Vycron, P23, polyester
50	257 - 258	Dacron 54 and 64, polyester
50	264	nylon 66, polyamide
53	278	Vicara, protein
53	290	Kodel, polyester
55	297	Arnel, triacetate

FIBERS THAT SHOW ABRUPT HIGH SHRINKAGE BUT DO NOT FUSE

Voltage	*Shrink point*	*Fiber*
40	180 - 182	Darvan X-7, nytril
47	223 - 226	Vinal 5F, Type RHT, polyvinyl alcohol
47	228 - 231	Vinal 5F, Type MCM, polyvinyl alcohol

moves toward liquid: Acrilan, Creslan, Orlon, Zefran.

b) Examine perpendicular. Fiber is only faintly visible. Becke Line moves toward liquid. Now examine parallel and fiber is visible. Becke Line moves toward fiber: nylons 66 and 6, polyethylene, polypropylene, vinal, viscose rayon. Polypropylene may be quite visible perpendicular.

c) Fiber starts to swell and dissolves within five minutes: Rhovyl.

In monochlorobenzene, all fibers in remaining Group 5 have Becke Lines that move toward the fiber upon focusing up when examined either parallel or perpendicular.

GROUP 5———Mount in methyl salicylate, n = 1.537.

a) Examine parallel. Fiber is only faintly visible or invisible. Becke Line moves toward liquid: alginate, Dynel, Verel, Vicara. See further information on Verel in Confimatory Tests.

b) Examine parallel. Fiber is very visible. Becke Line moves toward fiber: Saran.

CONFIRMATORY TESTS

GROUPS 1 AND 2———Corval, Dacron, Fortisan, Kodel, nylon 66 and 6, polyethylene, polypropylene, viscose rayon, Topel, Vycron.

All of these fibers show polarization colors when examined in the 45-degree position under crossed polarizers. They all have a positive optic sign, and all have round cross sections except regular Fortisan, which is lobed, and viscose, which is serrated. High-strength rayons may have cross sections of various shapes (*13*). The cross sections of regular Fortisan and viscose rayon identify them in this group. Corval and Topel are microscopically similar to viscose rayon and would be identified as such. However, Corval is insoluble in cuprammonium hydroxide, whereas viscose is soluble (*10*). Fortisan 36, which has a more or less round cross section, does not fuse, as do the other round section members of this group.

The Group 2 fibers Dacron and Vycron are immediately identified because they are the only two among all considered in this paper that have a Becke Line that moves toward the fibers when examined parallel in 1-bromonaphthalene. They are distinguished from Kodel by the fact that when mounted in monochlorobenzene and examined perpendicular, Kodel's Becke Line moves toward the fiber, whereas nylon's line moves toward the liquid. Dacron's and Vycron's lines also would move toward the fiber, but they will be eliminated by their behavior in 1-bromonaphthalene.

Final confirmation, and identification of nylon type, is obtained by micro fusion point: nylon 6 = 224°C, nylon 66 = 264° C, Kodel = 290° C. The nylons are soluble in concentrated formic acid at room temperature.

The polyolefins are distinguished between themselves, and from the others by their micro fusion points: high density linear polyethylene = 126 – 135°C, isotactic polypropylene = 165 – 166°C. They also have a density less than 1.0 and therfore float on water.

GROUP 3——— Acetate, Arnel, Darvan. Under crossed polarizers, Arnel remains dark, or nearly so, throughout rotation, and shows no color change with the first order red plate. With this plate, occasionally an extremely faint color may be seen along parts of the fiber, but for all practical purposes the fiber is *isotropic*. It is the only isotropic fiber among all considered, and this property affords an easy way of distinguishing it from acetate. Arnel's cross section is more serrated than that of acetate. Arnel shrinks and fuses abruptly at 297°C.

Acetate shows low order silver under crossed polarizers, and has a positive optic sign. It decomposes, but does not fuse when heated in silicone oil.

Darvan is dull silver, and has a negative optic sign. Darvan X-7 also has an abrupt high shrinkage point at 180-182°C.

All three fibers have characteristic cross sections.

Acetate is soluble in acetone at room temperature whereas Arnel swells. Arnel is soluble in chloroform 10 minutes at room temperature, while acetate is deformed (*11*). Acetate is soluble when shaken one hour in 70% V/V aqueous acetone, whereas Arnel is insoluble (*12*).

GROUP 4———a) Acrilan, Creslan, Orlon, Zefran; b) nylons 66 and 6, polyethylene, polypropylene, vinal, viscose rayon; c) Rhovyl.

a) All of the fibers in this subgroup are low order gray or silver, and all have a negative optic sign. Orlon is readily identified here by its dogbone cross section, while the others generally are round.* Orlon also has longitudinal striations and twists due to its contour, whereas the others are rod-like, with few

*The most characteristic shape of Orlon Type 21 is a compressed dogbone with one end mushroomed out, along with some irregular lobed.

if any twists. Acrilan in 3 d/f is round, but 5 d/f and higher may be bean shaped. Creslan generally is round, but some samples have shown a mixture of round, squat dogbone and kidney bean shapes. Probably due to crimping, Zefran may show frequent bends and at these points, a nodule-like surface deformity.

If Acrilan, Creslan or Zefran are indicated, mount in anisole, n = 1.518. In anisole, and examined parallel, Acrilan and Creslan show indistinct Becke Lines. Their fiber substances are almost invisible, as they are practically at their index of refraction. Zefran examined parallel shows a good sharp Becke Line that moves toward the fiber, and although the fiber substance appears faint, it is considerably more visible than that of Acrilan or Creslan.

b) All of these fibers appear in this sub-group because of their behavior in monochlorobenzene. When examined parallel, all of their Becke Lines move toward the fiber, and when perpendicular, the Lines move toward the liquid. For data on nylons 6 and 66, polyethylene, polypropylene and viscose rayon (Corval, Topel) see Confirmatory Tests, Groups 1 and 2. The nylons, polyolefins and viscose rayon all possess high birefringence and show polarization colors under crossed polarizers. They all have a positive optic sign.

Vinal 5F (international name vinylon) appears gray to yellowish at widest part under crossed polarizers. Colors may show at the twists where the fiber is being viewed on edge.

Vinal 5F has a positive optic sign. Its behavior in monochlorobenzene is the same as above, and it is practically invisible when examined perpendicular. The clear skin edges disappear, and the fiber substance is visible only because of the dark longitudinal pitting. Vinal 5F has a characteristic multiform cross section with a pronounced skin-core effect. Final confirmation is made possible by the fact that Vinal 5F Type RHT shrinks greatly and abruptly with flaring of the cut ends at 223-226°C. Type MCM shrinks abruptly at 228-231°C. This shrinkage is probably due to release of internal strain and softening, although the fiber does not fuse up to 300°C. Vinal (Kuralon) is soluble in formic acid at 55°C, and also in phenol and cresol (*15*). All three are also solvents for nylon.

c) Rhovyl falls in this sub-group because of its solubility in monochlorobenzene. Mounted in this liquid, the fiber swells, and its pitted surface shifts to the center, giving a sort of medulla, which, after approximately five minutes, breaks up and disappears, leaving a colorless structure. In monochlorobenzene, the Becke Line moves toward the fiber both parallel and perpendicular.

Rhovyl (polyvinyl chloride) is low order gray under crossed polarizers, and has a positive optic sign. It can thus be readily distinguished from the acrylics with round cross sections in Group 4a, because these all have a negative sign. Rhovyl's cross section is generally round with some having one, or both sides slightly indented.

Final confirmation may be made by Rhovyl 55's micro fusion point of 206-208°C. The fiber shrinks abruptly at approximately 85°C due to its design as a high shrinking type. Fusion proceeds very slowly, and complete softening, as evidenced by the fusing together of crossed fibers, occurs at 206-208°C. The fiber decomposes when heated in air.

GROUP 5———a) alginate, Dynel, Verel, Vicara; b) saran

a) Calcium alginate is rarely met with. It has a characteristic sharply serrated or branched cross section, is low order gray under crossed polarizers, has a positive optic sign and is soluble in weak alkalis.

Dynel has a characteristic multiform cross section, is low-order gray under crossed polarizers, and has a positive optic sign. This positive sign makes it easy to distinguish in blends from the acrylics with which it is frequently met. It is soluble in warm acetone.

Verel has a dogbone cross section, and is practically the same as Orlon both in cross section and longitudinal appearance. Verel differs in that it is readily and completely soluble in hot acetone, and this test should always be used to distinguish between them. Normal Verel is almost invisible in methyl salicylate, but caution must be exercised here, because some dyed samples have appeared very visible. To confirm identity, use the solubility in hot acetone, and the fact that the Becke Line of Verel moves toward the fiber in monochlorobenzene when examined parallel and perpendicular. Orlon's Becke Line moves toward the liquid. Verel is low order gray under crossed polarizers, and is the only fiber in Group 5a that has a negative optic sign.

Vicara is no longer being produced, but is included as an example of the azlon generic group, and because it still may be encountered. Vicara is low order gray under crossed polarizers and has a positive optic sign. It is the only fiber in Group 5a that has a round cross section. Final confirmation may be made by its sharp micro fusion point of 278°C.

b) Saran has a negative optic sign, and is the only fiber mentioned in this paper that appears a whitish-lemon-yellow in the 45-degree position under crossed polarizers. Its cross section is generally round, although it may be special shapes. Final confirmation may be made by its shrinkage and micro fusion point of 174-176°C. Saran is soluble in monochlorobenzene at the boil five minutes.

SUMMARY

Part I briefly discussed the Becke Line observation, and gave the mounting liquids and procedure for fiber group separation and confirmatory tests.

Part II discussed some of the techniques of polarized light microscopy and their application to the scheme of analysis.

Part III has consisted of a brief discussion of micro fusion and its application, and a revision of the Procedure to include the latest fibers. It represents a fairly comprehensive treatment of the use of light microscopy in the identification of synthetic fibers.

As the final form of fibers is usually a dyed and finished fabric, methods of identification which can be performed directly, and are subject to few interferences are the most desirable. The microscopic method meets these requirements.

It is hoped that the data presented may be of assistance in the identification of unknown man-made fibers.

REFERENCES

(*1*) Smith, Sidney G, "Identification of Unknown Synthetic Fibers," *Am Dyestuff Reptr 47*, No. 5 (Mar 10, 1958).
(*2*) Smith, Sidney G, "Identification of Unknown Synthetic Fibers, Part II, Applications of Polarized Light Microscopy," *ibid 48*, No. 6 (Mar 23, 1959).
(*3*) Quynn and Steele, "The Birefringence of Dacron Polyester," *Textile Research J 23*, No. 4, 258 (April, 1953).
(*4*) Grabar, Donald G, and Haessly, Rita, "Identification of Synthetic Fibers by Micro Fusion Methods," *Anal Chem 28*, No. 10 (Oct, 1956).
(*5*) Technical Service Data, "Kofler Micro Hot Stage," Arthur H Thomas Co, Philadelphia, Pa.
(*6*) Schaeffer, Harold F, "Microscopy for Chemists," (1953), D Van Nostrand Co, NY.
(*7*) Chamot and Mason, "Handbook of Chemical Microscopy," Vol 1, 3rd ed (1958), John Wiley and Sons, NY.
(*8*) McCrone, Walter C, "Fusion Methods in Chemical Microscopy," Interscience Publishers, Chicago, Ill.
(*9*) Air Reduction Chemical Co, General Bulletin #2 (1959)
(*10*) Courtaulds (Alabama) Technical Bulletin, "Corval," July 16, 1958
(*11*) Praeger, Siegfried S, "Selective Solvents for Analyzing Textile Fiber Mixtures," *Am Dyestuff Reptr 46*, No. 14, 497 (July 15, 1957)
(*12*) Armfield, W, "The Quantitative Analysis of Binary Fibre Mixtures Containing Tricel (Cellulose Triacetate)," *J Textile Inst*. Proceedings, 50, No. 3 (Mar, 1959)
(*13*) Smith, D K, "High-Strength Regenerated Cellulose Fibers," *Textile Research J 29*, No. 1, (Jan, 1959)
(*14*) Feigl, Fritz; Gentil, Vincent; Jungreis, Erwin, "The Application of Spot Tests in the Examination of Synthetic Fibers," *ibid 28*, No. 10 (Oct, 1958)
(*15*) Moncrieff, R W, "Artificial Fibers," 2nd ed, 304, (1954), Nat Trade Press Ltd, London

Proceedings of the
American Association of Textile Chemists and Colorists

Copyright, 1959, American Association of Textile Chemists and Colorists

December 28, 1959 No. 26

1959 Intersectional Contest——

A STUDY OF THE REMOVAL OF METAL IONS FROM COTTON FABRICS*

RHODE ISLAND SECTION

COMMITTEE

William E Aldrich, Chairman
Edward N Alexander
William H Cady
Francis H Casey
William J Cooney
Frank Cutter
Edmund J Dupre
David C Hardman
Frank J Lachut
Alden D Nute
W George Parks
Robert H Phillips
Fernand Schlaeppi
William H Waitz Jr

This paper is a study of the relative efficiencies of four different chelating agent types when applied under various conditions of pH and temperature to cotton cloth of known contamination. The results were determined by quantitative spectrographic analyses of residual ash from cotton fabrics treated by various procedures.

The paper shows that chelating agents are effective in the removal of cations from cotton fabric. However, their efficiencies are effected by various conditions of temperature and pH.

INTRODUCTION

THE use of both organic and inorganic chelating agents in the textile industry has been accepted and their efficiency well established over a period of many years. Numerous articles have been published describing the difficulties caused in textile processing due to trace metals and the part played by chelating agents in minimizing these difficulties. Detailed studies have been made showing the effect of trace metals on shades obtained with different classes of dyestuffs on various fibers (*1,2,3,4,5,6*). Also, published work has covered the chemical aspects of chelation (*7,8,9, 10*) and its application in bleaching and other phases of textile wet processing (*11,12*).

Within the available literature, applications and limitations of the several types of chelating agents are reviewed quite thoroughly. It is known, for example, that there are available various amino carboxylic acid types, each designed for efficient chelation of certain cations under various conditions of acidity or alkalinity. It is also recognized that, when wet-processing solutions are maintained at the boil, the "glassy phosphate" chelating agents decompose to orthophosphates and thus lose their sequestering action. It has been pointed out, however, that certain polyphosphates, while losing their ability to chelate at the boil, are nevertheless still able to disperse calcium and magnesium salts (*5*).

While there exists a wealth of this published information, a literature search has shown that it deals largely with general applications and results. Detailed information concerning specific cation-sequestering efficiency, under various conditions of applications, seemed to be somewhat lacking. Also, most data reviewed were directed toward studies of cations in solution rather than cations on the fiber. However, recognition has been given to the fact that metal ions bound to both wool and cotton are also a source of trouble, notably in bleaching and dyeing (*2,9,10*).

The literature has shown that cotton, by means of scouring (kier-boiling, etc) can be washed free of about 85% of its bound trace metals (*18*). Studies have revealed a residual ash after kier-boiling, varying from 0.05% to 0.75% (*14*). The metals remaining are largely the troublesome iron and aluminum, and to a lesser extent calcium and magnesium (*13,14,15,16,17, 18,19*). It is also known that cotton can itself act as a chelating agent by its ability to pick up heavy-metal ions from water (*3*).

The present investigation, as reported below, comprises a study of the relative efficiency of four different chelating agent types when applied under various conditions of pH and temperature to cotton cloth of known cation contamination. The results were determined by a quantitative spectrographic analysis of residual ash from cotton fabric treated by various procedures.

CHEMISTRY OF CHELATING AGENTS

Chelating agents are compounds, organic or inorganic, which form complexes with metal ions where the cation is held in a cyclic or ring structure. There are a great number of chelating agents: among the inorganic, the polyphosphates are the best known; in the organic field only the sugar acids and the aminocarboxylic acids have been widely accepted in textile processing.

The polyphosphates have been used extensively for chelating agents.

So-called tetraphosphate, which is a mixture of polymers of various chain lengths (*20*), belongs to the class of poly acids and their salts which hydrolyze to the uncondensed form (orthophosphate) in aqueous solutions (*24*). The half-life of the P-O-P linkages with respect to hydrolysis at neutral pH and room temperature is of the order of magnitude of many years.

A number of factors affect the rate at which chain phosphates undergo hydrolytic degradation in aqueous solution. They are listed in decreasing order of effectiveness:

*Presented by William E Aldrich on October 9, 1959 at the Park Sheraton Hotel, Washington, DC, during the 38th National Convention

1) Temperature	10^5 - 10^8 times faster from freezing to boiling.
2) pH	10^3 - 10^4 times slower from strong acid to base.
3) Enzymes	As much as 10^5 - 10^9 times faster than without enzymes.
4) Colloidal gels	As much as 10^4 - 10^5 times faster than without colloidal gels.
5) Complexing cations	Very many-fold faster in most cases.
6) Concentration	Roughly proportional
7) Ionic environment in the solution	Several-fold change

Study of these factors has been going on for many years, but in spite of the large amount of work completed, much remains to be done, particularly in study of the items 4-7.

The effect of temperature is best known and the rate doubles for about every 5°C rise in temperature. The time for hydrolysis of 5% of the P-O-P linkages of long-chain phosphates (in a 1% solution) at pH 7 and 10 is on the order of a century at 0°C, but this decreases to about two hours at 100°C.

At higher pH values (above 7) the polyphosphates do not hydrolyze directly to orthophosphate, but rather as the P-O-P linkages are broken shorter chains are formed, particularly the pyrophosphate. The latter, although it does not have a particularly high sequestering value, is still an excellent dispersing agent. This, then, is an explanation for the excellent results achieved in many commercial applications in which the condensed polyphosphates are so highly successful.

Ethylenediamine tetraacetic acid (EDTA) is the most widely used aminocarboxylic acid. It binds metallic ions within its structure and inactivates them.

Once the metal is bound it is not available for reaction with other materials in solutions. The classic example of this is the use of EDTA to soften water and prevent precipitation of calcium and magnesium soaps. EDTA forms strong complexes with heavy metal ions (ie, copper, nickel, cobalt, lead, etc) and also with the alkaline earth metal ions (calcium, magnesium, barium, strontium). Because of this ability to form strong stable chelates with a variety of metal ions, EDTA may be called a broad spectrum chelating agent.

The extent to which complex formation occurs is expressed by the equilibrium constant K using the following equation for the reaction X^{++} + EDTA = X EDTA (*21*):

$$K = \frac{(X\ EDTA)}{(X^{++})\ (EDTA)}$$

K defines the ratio of X which occurs as X EDTA complexes to X in the ionized state. Where K is very large, the X ion concentration will be low. Using Ca as an example:

$$K = \frac{(Ca\ EDTA)}{(Ca^{++})\ (EDTA)} = 3.9 \times 10^{10}$$

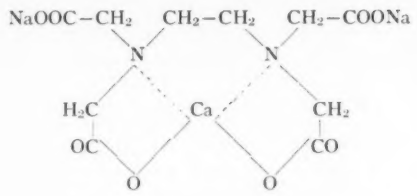
The log of K varies from 7.76 to 25 for the alkaline earth metals and the heavy metals (*22*).

The strength of chelation varies with pH, and there has been some difficulty using EDTA in a pH range 7-11.5 to control iron. For this purpose two newer materials have been made commercially available.

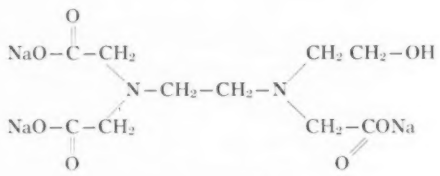
For control of iron in the pH range of 2-11.5 plus the heavy metal salts and alkaline earth metals, the trisodium salt of N-hydroxyethylenediamine tri-acetic acid has been widely accepted (*23*).

More recntly the pentasodium salt of diethylenediaminepentaacetic acid has been used for this purpose, the advantage lying in its stability to oxidation (*24*).

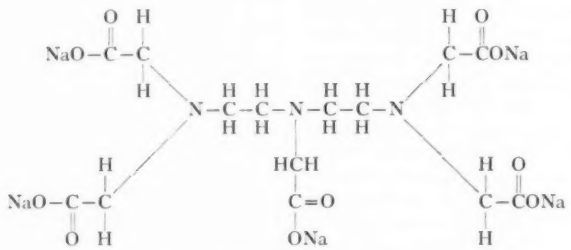
The work done in this paper has been to determine the effectiveness of chelating agents in removing oxides from cotton fabric. The chelating agent theory is applicable only to ions in solution. The chelating agents act in two different methods in the removal of oxides from cotton. One is the solubilizing effect of the chelating agents. The other is the removal of ions in solution shifting the normal equilibrium of the solubility constant toward solution of the metal ion.



di-sodium Ca Salt of EDTA



(Na_3 HEDTA)
Tri-sodium salt of N-hydroxyethyl-ethylenediamine tri-acetic acid.



(Na_5 DETAPA)
Penta-sodium salt of diethylenetriamine pentaacetic acid

THEORY OF SPECTROGRAPHIC ANALYSIS

The principle of spectrographic analysis is based on the quantum theory of energy transfer in molecules and electrons. A detailed explanation of quantum mechanics and the mechanism by which molecules absorb energy is beyond the scope of this paper. However, the basic concept is predicated on the theory that planetary electrons of atoms revolve about the nucleus in fixed orbits, he'd in these orbits by a definite quantity of energy which is characteristic of that orbit. The amount of energy possessed by a given electron becomes greater as the electron moves from an inner to an outer orbit, owing to the fact that energy is absorbed when oppositely charged particles are moved further apart. Thus, whenever an atom is excited by exposure to some

TABLE I
Metal ion contaminant solution

Cation			Standard solution contains (in ppm)
Mn	++	$MnCl_2.4H_2O$	200
Fe	++	$FeCl_2.4H_2O$	3000
Al	+++	$Al(NO_3)_3.9H_2O$	7000
Ca	++	$CaCl_2$ anh	10000
Mg	++	$Mg(NO_3)_2.NH_2O$	10000
Cu	++	$CuCl_2.2H_2O$	200
Cr	+++	$Cr(NO_3)_3.9H_2O$	50
Ni	++	$NiCl_2.6H_2O$	50

TABLE II
Chelating agents used

Chelating agent	Conc stock solution (gpl)	Conc treating solution (gpl)
Ethylene diamine tetra-acetic acid (EDTA)	14.128	0.330
N-Hydroxyethylethylene-diamine tri-acetic acid (HEDTA)	23.921	0.558
Diethylene triamine penta-acetic acid (DETAPA)	36.032	0.842
Sodium tetraphosphate ($Na_6P_4O_{13}$)	14.128	0.330

external source of energy, such as an electrical discharge, the electron absorbs this energy by jumping to an outer orbit. An electron in any but its innermost orbit is in an excited state and is capable of emitting radiant energy in the form of light by reversing this process and jumping back to an inner orbit. The light emitted when an electron jumps from one orbit to an inner orbit is of a definite frequency and corresponds to a line in the element's omission spectrum.

The spectrograph itself consists of a system whereby a sample to be analyzed is ignited by an electric discharge between two carbon arcs. The light produced passes through an optical system and onto a diffraction grating which in turn exposes the resulting spectrum on a photographic plate.

In the case of preparing a spectrogram of an unknown substance, the plate is calibrated for wave length by comparison with a spectrogram of known wave lengths, such as a mercury or iron spectrum taken with the same spectrograph. Thus, the wave lengths of spectral lines of the unknown may be identified by their relation to the positions of lines of known wave length. Once the relationship and wave lengths of the unknown spectral lines are established, the element which produced them may be identified.

A quantitative interpretation of a spectrogram may be made by determining the relative intensity of its spectral lines. The line intensity may be measured by either a photoelectric cell or a thermopile system and compared with other spectra produced from known concentrations of the element in question (*20,21,22*).

EXPERIMENTAL PROCEDURE

Preliminary work was carried out as discussed in the detailed procedure outlined below, with the exception that the paddings were made at 100% pickup and the samples were run at pH 3, 7 and 12 only, and only at room temperature. The results obtained from this work led to the following investigation.

PREPARATION OF STANDARD CONTAMINATED FABRIC——A standard contaminated test fabric was prepared by padding a 39" 80/80 4.00 bleached and mercerized cotton fabric with a metal ion contaminant solution as shown in Table I. Before padding, the contaminant solution was diluted 1:9 with distilled water and the pH adjusted to 5.06, using cp sodium acetate. The cloth was padded, using a single dip and nip with 70% expression, and was frame-dried.

Portions of the standard contaminated fabric were exposed to ammonia vapors and then heated for three minutes at 325°F to precipitate the cations.

FABRIC TREATMENT WITH CHELATING AGENTS——Four chelating agents were selected for the experimental work. These were prepared in solutions so that one ml would chelate one gram of the standard cation solution and leave a 50% excess of the chelating agent. Calculating the mole ratios of each chelating agent and allowing for a 50% excess, the chelating solutions were prepared as shown in Table II.

The cation-contaminated cloth was cut into 40-gram samples, and since this cloth was padded at 70% pickup, 28 grams of standard cation solution were contained in each sample. Therefore, 28 ml of the chelating solution were used, and as the cloth samples were treated at a liquor-to-cloth ratio of 30:1, 28 ml of the chelating solution were diluted to 1200 ml with distilled water. The pH was adjusted, using a glass electrode meter, with ACS-grade glacial acetic acid, sodium carbonate, or sodium hydroxide. Solutions were prepared at a pH of 3.0, 4.0, 6.0, 7.0, 8.0, 10.0, 11.0, and 12.0, and tests were run at two temperatures: approx room temperature and 210°F. Blanks containing no chelating agents were also run at both temperatures, and at all pH's.

The fabrics were immersed for 20 min in the solution with occasional stirring, and were then rinsed three times for three min each with 1200-ml portions of distilled water, with a hand squeeze after each rinsing. The fabrics were then air-dried.

Approximately 10 g of each fabric was ashed and examined spectrographically to determine the cations present.

SPECTROGRAPHIC ANALYSIS OF ASHED SAMPLES

The percent ash of each cloth sample was calculated, based on the bone-dry weight of the fabric, after which a portion of each ash was used for spectrographic analysis, following a standard procedure outlined in Harvey (*23*). The instrument used for this work was a 1.5-meter grating spectrograph (Applied Research Laboratory) with which the analysis was made in a spectrum range of 2500 A to 3500 A.

One mg of ash, along with nine mg of lithium carbonate, was burned in a dc arc on the spectrograph. The lithium carbonate acts as a diluent and thus serves to produce simple spectra with good sensitivities and low background. It also serves to change the multiple major component system of this cloth ash into the single major component system of lithium. This simplifies, and improves the accuracy of, evaluating spectra on the negative produced. In addition to the ash samples, a blank of 10 mg of lithium carbonate was placed on the same spectrogram negative. Impurities found in the diluent, in this blank exposure, were deducted from the amounts found before calculating to percent of the sample ash. All results as developed on the spectrogram were calculated back to amounts of ash burned on the spectrograph, which in turn determined the percent of constituent in the ash.

Because all results determined from the spectrograms could possibly vary from one-half to twice the recorded figures, it became necessary to calculate the concentration of each cation

determined, by presuming that the ash consisted essentially of the oxides of all metals in the cloth. The percent cations determined in a given spectrogram were therefore recalculated as percent cation oxide. By determining the total oxide and relating it to 100%, it became possible to recalculate the percent cations in a given ash sample. Once this had been done, it became a simple matter to calculate the parts per million of each cation in the various cloth samples from which an ash had been analyzed.

The general formulas used in the work discussed above would be as follows:

1) % Total cation oxide $= \sum \frac{(\text{mol wt of oxide})\ (\%\ \text{cation from spectrograph})}{\text{mol wt of cation}}$

2) Corrected % cation $= \frac{(100)\ (\%\ \text{cation from spectrograph})}{\%\ \text{total cation oxide}}$

3) Ppm cation in cloth = (corrected % cation) (% ash) (100)

Combining 2) and 3):

4) Ppm cation in cloth $= \frac{(100)\ (\%\ \text{cation from spectrograph})\ (\%\ \text{ash})\ (100}{\%\ \text{total cation oxide}}$

DISCUSSION

The results of the spectrographic analysis are shown in Tables III-XIV. Table III lists the results of the preliminary investigation carried out at room temperature and at pHs 3, 7, and 12. Tables IV-XIV give the results of the detailed investigation, the procedure for which has been outlined in the previous section.

Before attempting to draw conclusions from the data, apparent discrepancies in the analysis results should be pointed out and explained.

The actual fabric treatment with chelating agents was carried out in four different laboratories—each using one chelating agent. Therefore, a normal analysis variance must be expected when more than one laboratory is doing the work. In addition to this, there are two cations—sodium and phosphorus, the analysis results of which hold no particular significance. In the bath adjustments, both sodium carbonate and sodium hydroxide were used, therefore the amounts reported in an analysis would be due largely to that added to acquire the necessary pH value. In Tables IV-XIV the values for phosphorus cannot be relied upon as accurate, inasmuch as no phosphor line exists in the portion of spectrum covered which is free of iron interference, especially when iron exists at the level here found. While not accurate, the phosphorus results are nevertheless interesting inasmuch as the analysis results for the samples using sodium tetraphosphate (Tables X and XI) shows a proportionately higher phosphorus content, especially at 210°F where conversion to orthophosphates has taken place.

Other cations, the analysis results of which seem a bit erratic, are as follows:

1) Aluminum in the contaminated samples, as shown in Tables III and XIV, seems to be somewhat low. Judging from the figures in other analyses, a result of 140 to 150 ppm would be indicated in Table XIV, and perhaps 110 to 120 ppm in Table III.

2) Silicon in the contaminated sample as shown in Table III seems to be exceptionally low, and its accuracy is very doubtful. Also, the other silicon figures in Table III seem a bit erratic. Other than these exceptions, all reported results seem to be within the limits of experimental error.

TABLE III

Initial evaluation of chelating agents at pH's 3, 7, and 12

	pH—3				pH—7			
Ion (ppm)	*EDTA*	*HEDTA*	*DETAPA*	*$Na_6P_4O_{13}$*	*EDTA*	*HEDTA*	*DETAPA*	*$Na_6P_4O_{13}$*
Mn	1.3	0.9	1.0	0.9	0.6	0.8	1.1	0.8
Fe	11.0	15.8	15.8	9.8	11.6	7.7	10.7	7.6
Al	47.6	41.2	54.3	34.0	25.3	27.2	34.8	30.3
Ca	25.0	22.0	23.0	23.0	9.5	52.8	33.2	46.2
Mg	294.0	304.0	288.0	224.0	222.0	272.0	212.0	207.0
Cu	7.7	2.4	5.4	3.6	1.7	2.6	3.2	1.0
Cr	0.7	0.9	0.5	0.6	0.4	0.5	0.3	0.3
Ni	1.2	0.8	0.2	1.0	0.8	1.8	0.8	1.0
Na	97.0	114.0	124.0	72.0	137.4	67.2	89.2	136.8
P	nil	nil	nil	66.0	60.2	59.2	96.6	73.2
Si	44.5	45.7	51.0	26.0	71.4	46.1	31.8	33.0
Total ions in cloth	530.0	547.7	563.2	460.9	540.9	537.9	513.7	537.2
Percent ash in cloth	0.088	0.090	0.093	0.080	0.092	0.092	0.093	0.096

	pH—12					
Ion (ppm)	*EDTA*	*HEDTA*	*DETAPA*	*$Na_6P_4O_{13}$*	*Fabric contam*	*Original fabric*
Mn	8.6	15.4	11.3	8.7	13.2	2.9
Fe	41.0	69.0	57.0	42.5	58.0	6.7
Al	100.0	117.0	82.0	64.0	91.0	10.5
Ca	299.0	720.0	528.0	346.0	910.0	67.0
Mg	2530.0	2440.0	2360.0	1495.0	2634.0	186.0
Cu	12.0	12.0	10.0	7.0	5.8	1.4
Cr	1.1	0.9	1.0	0.6	0.7	0.1
Ni	2.8	0.8	0.9	1.6	1.4	1.9
Na	166.0	180.0	179.0	28.0	33.0	9.5
P	nil	nil	nil	535.0	nil	nil
Si	13.0	18.0	12.0	20.4	2.6	12.8
Total ions in cloth	3173.5	3573.1	3241.2	2548.8	3749.7	298.8
Percent ash in cloth	0.520	0.570	0.510	0.450	0.590	0.048

TABLE IV
(EDTA)
Room temperature (68°F)

Cation	pH 3	pH 4	pH 6	pH 7	pH 8	pH 10	pH 11	pH 12
Mn	1.5	2.0	3.3	3.1	4.0	3.5	4.2	5.6
Fe	16.1	18.0	21.3	20.9	22.2	21.2	30.0	43.7
Al	64.3	67.6	98.8	93.4	94.4	102.1	109.8	116.4
Ca	30.0	29.1	38.0	27.3	23.6	18.7	49.3	109.7
Mg	128.2	136.7	135.3	149.7	180.3	174.4	415.0	1201.0
Cu	3.0	2.6	3.2	2.2	2.5	2.4	4.0	6.9
Cr	1.0	1.1	1.1	1.2	1.3	1.4	2.6	3.2
Ni	0.5	0.5	1.1	1.2	1.3	1.4	1.9	2.6
Na	29.1	44.5	41.0	33.0	31.9	43.6	97.6	119.7
P	88.1	85.5	126.1	130.4	134.6	124.6	140.6	171.0
Si	76.0	77.0	79.0	73.9	72.1	100.9	111.0	121.6
Total cations	437.8	464.1	548.2	536.3	568.2	594.2	966.0	1901.4
% Ash	0.076	0.085	0.102	0.126	0.106	0.111	0.157	0.208

TABLE V
(EDTA)
Elevated temperature (210°F)

Cation	pH 3	pH 4	pH 6	pH 7	pH 8	pH 10	pH 11	pH 12
Mn	0.2	0.2	0.3	0.5	0.7	1.0	1.6	2.8
Fe	0.9	1.0	4.0	7.7	15.3	16.3	22.7	31.0
Al	7.8	9.3	15.4	26.3	41.1	54.9	69.7	84.8
Ca	22.7	20.0	16.3	16.9	16.6	23.4	31.0	67.8
Mg	70.0	68.7	72.8	109.2	140.0	152.7	218.6	679.0
Cu	0.3	0.4	0.2	0.3	0.4	0.4	0.9	1.9
Cr	0.2	0.2	0.2	0.4	0.7	0.8	1.6	2.8
Ni	0.2	0.3	0.4	0.4	0.5	1.1	1.7	2.2
Na	14.0	15.3	12.6	16.8	21.0	27.5	40.1	59.9
P	21.4	20.3	30.0	37.6	50.0	93.7	109.6	106.0
Si	59.7	65.7	48.6	63.9	84.0	93.7	101.4	116.7
Total cations	197.4	201.4	200.8	280.0	369.8	465.5	598.9	1154.9
% Ash	0.025	0.037	0.037	0.056	0.068	0.087	0.082	0.095

TABLE VI
(Na_3HEDTA)
Room temperature (65-70°F)

Cation	pH 3	pH 4	pH 6	pH 7	pH 8	pH 10	pH 11	pH 12
Mn	2.0	2.6	3.4	3.0	4.1	4.4	5.4	6.1
Fe	22.7	28.7	36.4	34.0	38.9	37.7	46.0	57.0
Al	67.4	89.1	121.2	112.9	126.8	132.9	130.1	137.6
Ca	20.1	25.5	26.2	27.3	31.9	31.0	61.7	503.0
Mg	152.7	191.0	201.2	206.4	245.4	194.9	403.1	1176.0
Cu	3.0	2.6	4.4	3.7	3.9	3.1	3.9	6.7
Cr	0.5	0.6	0.7	0.7	0.6	0.9	2.1	2.9
Ni	0.2	0.2	1.2	1.0	1.2	1.2	1.7	2.7
Na	31.2	26.7	46.1	50.3	67.5	86.3	104.3	126.0
P	89.4	159.3	189.0	120.7	161.5	148.4	161.0	180.7
Si	52.1	76.5	101.8	81.6	88.0	99.7	104.9	116.0
Total cations	441.3	602.8	731.6	641.6	769.8	740.5	1024.2	2314.7
% Ash	0.078	0.112	0.136	0.107	0.139	0.134	0.192	0.236

TABLE VII
(Na_3HEDTA)
Elevated temperature (210°F)

Cation	pH 3	pH 4	pH 6	pH 7	pH 8	pH 10	pH 11	pH 12
Mn	0.3	0.4	0.5	0.5	0.5	0.7	1.6	3.4
Fe	5.0	5.5	9.1	8.9	9.8	14.1	19.7	40.7
Al	18.1	21.1	40.3	41.7	49.1	60.5	78.9	93.3
Ca	26.4	25.4	29.2	28.9	32.7	42.3	57.3	271.0
Mg	144.0	138.1	201.3	193.7	206.0	221.0	388.5	1095.0
Cu	0.4	0.4	0.7	0.9	1.6	2.4	3.0	3.9
Cr	0.3	0.2	0.4	0.4	0.4	0.5	1.5	2.9
Ni	0.3	0.3	0.4	0.3	0.3	0.3	1.0	2.1
Na	22.6	21.1	56.4	47.0	58.8	58.5	129.6	104.7
P	20.4	19.6	60.4	66.4	76.3	56.5	709.0	101.6
Si	61.4	72.7	82.5	80.0	87.2	88.7	116.3	109.8
Total cations	299.2	304.8	481.2	468.7	522.7	545.5	1506.4	1828.4
% Ash	0.072	0.054	0.085	0.090	0.093	0.096	0.167	0.153

TABLE VIII
($Na_5DETAPA$)
Room temperature (77°F)

Cation	pH 3	pH 4	pH 6	pH 7	pH 8	pH 10	pH 11	pH 12
Mn	1.5	1.7	1.3	1.8	2.2	4.1	5.2	6.1
Fe	19.1	20.2	19.5	21.7	23.5	27.9	40.1	49.6
Al	80.4	93.7	90.3	103.1	134.1	145.1	147.6	150.7
Ca	32.7	32.7	25.7	29.8	43.6	44.7	70.5	316.0
Mg	167.1	184.6	164.1	173.5	217.9	223.3	417.0	1194.0
Cu	2.0	2.1	4.1	4.9	5.9	6.9	4.9	6.0
Cr	1.0	1.6	1.3	2.0	2.2	2.2	3.0	3.3
Ni	0.6	0.7	1.1	1.3	1.5	1.3	1.9	2.6
Na	26.4	31.2	28.7	21.7	33.5	37.2	91.2	130.0
P	80.5	89.5	85.2	109.5	125.7	117.2	167.6	189.0
Si	80.1	86.6	88.3	91.3	98.9	119.1	139.5	151.3
Total cations	491.4	545.7	509.6	560.6	688.9	729.0	1088.5	2198.6
% Ash	0.070	0.100	0.094	0.110	0.127	0.134	0.209	0.239

TABLE IX
($Na_5DETAPA$)
Elevated temperature (210°F)

Cation	pH 3	pH 4	pH 6	pH 7	pH 8	pH 10	pH 11	pH 12
Mn	0.3	0.3	0.7	0.9	1.2	1.5	1.9	3.9
Fe	3.1	2.5	5.3	6.7	9.8	12.7	14.1	31.7
Al	21.6	16.8	32.9	43.0	61.3	77.1	80.1	89.9
Ca	24.7	20.2	39.5	41.7	49.0	43.5	51.6	301.6
Mg	80.0	71.4	131.6	161.3	220.6	226.7	370.0	1036.0
Cu	0.4	0.4	1.2	1.6	2.0	1.7	2.6	3.1
Cr	0.3	0.3	1.1	1.2	1.5	1.4	2.1	3.3
Ni	0.2	0.2	0.4	0.4	0.6	0.6	1.9	2.7
Na	26.4	13.9	22.4	31.6	36.8	22.7	139.0	151.5
P	20.7	17.2	40.2	51.0	74.8	78.9	111.6	121.6
Si	47.3	36.5	58.6	80.5	101.7	80.7	101.3	129.8
Total cations	225.0	179.7	333.8	419.9	559.3	547.5	868.1	1875.1
% Ash	0.047	0.032	0.060	0.088	0.101	0.099	0.154	0.162

TABLE X

(Sodium tetraphosphate)

Room temperature (71-73°F)

Cation	*pH 3*	*pH 4*	*pH 6*	*pH 7*	*pH 8*	*pH 10*	*pH 11*	*pH 12*
Mn	1.0	1.20	1.52	2.7	3.1	7.7	6.7	7.4
Fe	13.4	12.9	15.3	14.6	13.3	22.2	32.5	39.8
Al	37.0	38.6	51.8	67.5	71.6	88.6	102.6	119.3
Ca	14.8	16.3	17.9	22.3	24.8	32.5	51.4	477.1
Mg	69.3	74.5	83.4	111.6	115.0	162.6	481.7	1227.0
Cu	1.1	nil	1.3	1.0	0.3	0.6	4.2	6.3
Cr	0.2	0.3	0.3	0.4	0.4	0.7	2.3	3.4
Ni	0.4	0.4	0.8	1.0	1.1	2.4	1.9	2.3
Na	36.7	38.6	17.1	31.2	48.6	57.7	119.3	127.2
P	140.0	145.6	153.2	169.1	203.5	115.2	189.6	201.4
Si	79.1	81.5	80.9	82.3	81.6	108.0	116.5	129.0
Total cations	393.0	409.9	423.52	503.7	563.3	598.2	1108.7	2340.2
% Ash	0.073	0.079	0.086	0.101	0.109	0.117	0.221	0.285

TABLE XI

(Sodium tetraphosphate)

Elevated temperature (210°F)

Cation	*pH 3*	*pH 4*	*pH 6*	*pH 7*	*pH 8*	*pH 10*	*pH 11*	*pH 12*
Mn	1.2	1.7	1.8	2.0	2.7	3.1	3.3	3.2
Fe	14.4	15.1	17.0	19.6	22.7	24.9	33.6	40.7
Al	54.0	50.3	59.8	59.7	63.6	69.5	87.9	101.6
Ca	15.5	30.4	37.8	40.5	43.1	50.0	80.3	481.7
Mg	82.1	98.1	110.4	136.3	201.6	300.5	616.0	1217.0
Cu	1.0	1.6	2.1	2.3	3.0	3.4	5.0	6.1
Cr	0.8	0.6	1.0	1.0	1.6	2.1	2.3	3.3
Ni	0.6	0.7	0.9	1.1	1.7	1.9	2.1	2.8
Na	47.0	46.1	33.0	51.7	69.5	88.1	70.3	71.6
P	401.0	416.7	418.1	422.9	503.6	500.0	537.8	529.0
Si	57.6	88.4	93.6	101.4	116.8	109.2	118.6	111.2
Total cations	675.2	749.7	775.5	838.5	1029.9	1102.7	1557.2	2568.2
% Ash	0.161	0.210	0.244	0.269	0.266	0.274	0.276	0.271

TABLE XII

Contaminated bleached 80/80 cotton cloth———no chelating agent

Room temperature (71-72°F)

Cation	*pH 3*	*pH 4*	*pH 6*	*pH 7*	*pH 8*	*pH 10*	*pH 11*	*pH 12*
Mn	3.4	3.9	3.5	4.1	4.6	6.8	7.2	7.5
Fe	26.1	29.7	33.0	32.8	35.9	41.3	43.9	54.0
Al	80.0	93.6	81.9	107.4	110.1	121.3	128.0	137.6
Ca	32.8	36.9	37.6	39.8	41.6	47.3	79.7	497.0
Mg	163.9	188.6	187.2	201.7	238.5	298.5	617.4	1231.0
Cu	2.9	3.5	3.7	4.2	4.2	4.8	5.7	6.8
Cr	1.9	2.3	2.2	2.9	2.7	2.9	3.1	3.5
Ni	1.2	1.5	1.5	1.8	1.7	2.0	2.8	3.0
Na	50.2	69.3	59.2	93.0	89.1	77.6	109.3	118.0
P	60.1	81.0	70.9	90.1	81.7	83.4	109.5	133.0
Si	81.3	90.0	88.7	93.4	97.8	102.5	111.3	115.3
Total cations	503.8	608.3	579.4	671.2	667.9	788.4	1217.9	2306.7
% Ash	0.119	0.138	0.136	0.144	0.141	0.143	0.214	0.236

TABLE XIII

Contaminated bleached 80/80 cotton cloth———no chelating agent

Elevated temperature (210°F)

Cation	*pH 3*	*pH 4*	*pH 6*	*pH 7*	*pH 8*	*pH 10*	*pH 11*	*pH 12*
Mn	3.0	3.1	4.0	4.3	4.2	7.1	7.9	7.5
Fe	20.1	24.7	29.6	31.8	36.0	43.5	49.8	51.6
Al	69.7	80.0	93.5	99.1	106.3	129.7	136.1	130.0
Ca	33.0	34.2	40.1	42.0	47.9	45.8	86.9	488.0
Mg	139.2	177.4	181.3	197.0	202.5	301.6	639.0	1220.0
Cu	2.1	2.3	3.1	3.9	4.2	4.7	5.4	6.2
Cr	1.5	1.9	2.5	2.7	2.8	3.1	3.5	3.5
Ni	1.2	1.2	1.7	2.1	2.8	2.8	3.3	3.0
Na	37.1	31.4	70.7	80.0	75.5	115.0	117.4	121.0
P	73.1	93.8	79.4	76.8	84.2	101.0	120.3	141.5
Si	76.8	83.4	88.1	96.1	96.9	106.0	106.2	109.0
Total cations	456.8	533.4	594.0	635.8	663.3	860.3	1275.8	2281.3
% Ash	0.110	0.116	0.138	0.147	0.149	0.191	0.227	0.269

Comparing the analysis results of the two contaminated samples, it seems evident that calcium and magnesium are preferentially absorbed from the contaminant solution in both the 70% and 100% paddings. This may be seen in the Table XV, which lists the theoretical and actual cation pick-up, the latter being calculated by subtracting the cations existing in the untreated cotton from those found in the padded samples (Tables III and XIV).

This proportinately greater absorption of calcium and magnesium tends to confirm previous work in which the ability of cotton to pick up heavy metal ions from water has been discussed.

The data show that a large proportion of the metal contaminants in a cotton fabric will be removed by water at a pH below 10. Therefore metal contamination could develop in a processing bath even with the use of relatively pure water. This contamination, while small, could be cumulative and result in eventual concentrations of cations such as iron etc, which could prove troublesome. For example, if 2000 pounds of cotton fabric having an ash content of 0.39% were treated in water at a pH of 6, approximately 2/3 of the metals would be transfered from the fabric to the solution (see Tables XII and XIII), contaminating the bath with about four pounds of metal salt.

This figure for removal may be questioned somewhat, inasmuch as the contaminant was padded onto the fabric and did not occur naturally. Thus it could possibly be more easily removed. However, further work has been undertaken, which unfortunately could not be completed in time for inclusion in this paper, which attempts to correlate the results between artificial and natural contamination.

A sample of cotton—crop of 1957 grown in the vicinity of Columbia, SC—was obtained from the U S Department of Agriculture. This sample upon analysis revealed iron concentrations ranging from a minimum of 142 ppm to a maximum of 445 ppm. A portion of this cotton was carded and subjected to the following treatment: one-fourth of the sample was ashed and the remaining three-fourths was kier-boiled. One-third of the kier-boiled sample was ashed, one-third was treated in water at a pH of 3 and ashed, one-third was treated in water at a pH of 3 plus EDTA (in the same concentration as used in the previous work) and ashed. The ash of each was to be spectro-

TABLE XIV

Original bleached 80 x 80 cotton cloth uncontaminated and contaminated

Cation	PPM in cloth—orig	PPM in cloth—contam
Mn	0.77	7.6
Fe	3.73	55.0
Al	7.28	117.0
Ca	21.02	633.0
Mg	111.50	1410.0
Cu	2.60	6.2
Cr	0.09	3.4
Ni	0.43	2.8
Na	33.90	51.6
P	42.80	44.7
Si	11.60	110.0
Total cations	235.72	2441.3
% Ash	0.043	0.396

graphically analyzed, but time did not permit this. However, the ashings were completed and the results are as follows:

Original sample	0.880% ash
Kier boiled sample	0.180% ash
Kier boiled & acid water	0.060% ash
Kier boiled & acid water & EDTA	0.048% ash

From these figures, it may be seen that, here, as in the case of the artificially contaminated sample, acid water treatment reduced the ash by two-thirds.

These results indicate that metal contamination in cotton fabrics could be minimized by a pretreatment of the fabric. While ash figures indicate that acidic water accomplishes this to a great extent, it may be seen that this is due largely to the reduction of calcium and magnesium. The concentration for metals such as iron and copper, while materially reduced, is still sufficient to be troublesome. The data in this paper indicate that by using EDTA in the water at a pH of 3 and at elevated temperature these metals also may be effectively removed. By using acetic acid to adjust to the low pH, little damage should occur to the cotton fabric during treatment. The most logical place for such treatment would perhaps be as an acid sour prior to bleaching, thus removing, or effectively reducing, the quantity of iron and copper which is detrimental during bleaching.

This paper leaves many unanswered questions which may serve as a basis for future work. As already mentioned, time did not permit a spectrographic analysis of the work done with the cotton obtained from the Department of Agriculture. Thus we do not have complete data to correlate results between naturally and artificially contaminated cotton. However, in addition to the ash results discussed above, there is further evidence that natural contaminants would be largely removed. With the exceptions of aluminum, calcium, and silicon, the sample treated with EDTA at a pH of 3 at 210°F is lower in metal contamination than the original fabric. (See Tables V and XIV).

Concluding, from the experimental results as recorded in this paper, the apparent ineffectiveness of the chelating agents evaluated at high pH levels is pronounced, indicating varying chelating properties of these agents when treating contaminants in the fabric and in aqueous solutions.

TABLE XV

Cation	Theoretical pick-up 70% pick-up	Theoretical pick-up 100% pick-up	Actual pick-up 70% pick-up	Actual pick-up 100% pick-up
Mn	14 ppm	20 ppm	6.8 ppm	10.3 ppm
Fe	210	300	51.3	51.3
Al	490	700	109.7	80.5
Ca	700	1000	612.0	843.0
Mg	700	1000	1298.5	2448.0
Cu	14	20	3.6	4.4
Cr	3.5	5	3.3	0.6
Ni	3.5	5	2.4	nil

The results of the spectrographic analyses for the most significant cations are shown in the bar graphs (Figures 1-10). Each graph represents the concentration of one cation, at either room temperature or 210°F, plotted against pH.

At each pH level are six bars representing the contaminated sample, the sample treated with distilled water or blank, and samples treated with each of the four chelating agents.

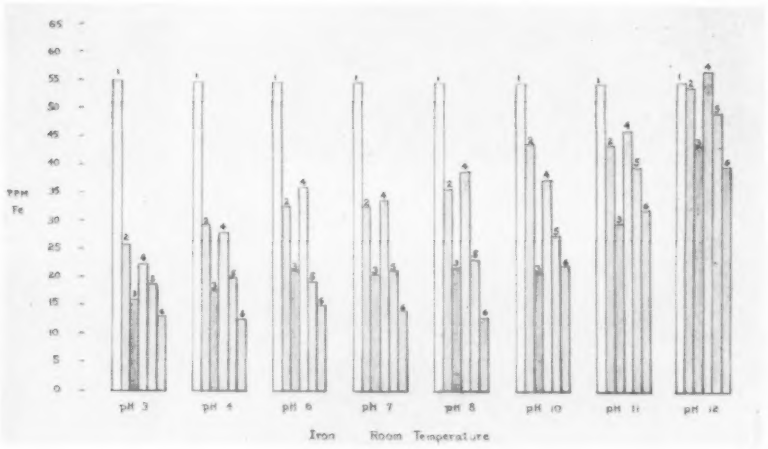


Figure 1

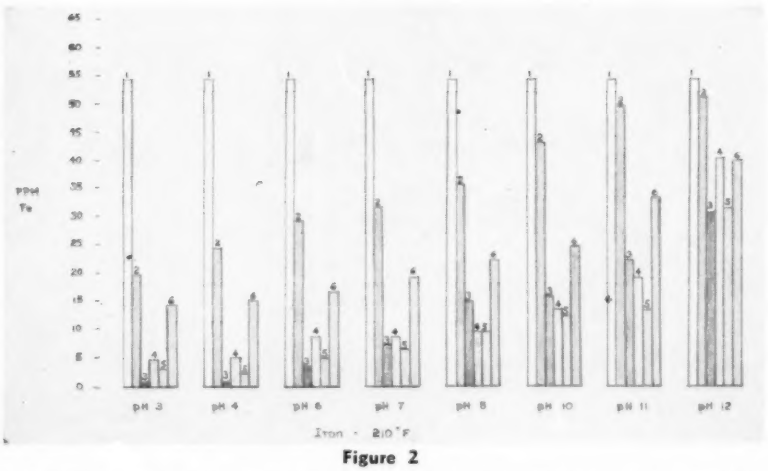


Figure 2

1—Contaminated sample; 2—Blank; 3—EDTA; 4—Na_2HEDTA; 5—$Na_5DETAPA$; 6—$Na_6P_6O_{18}$

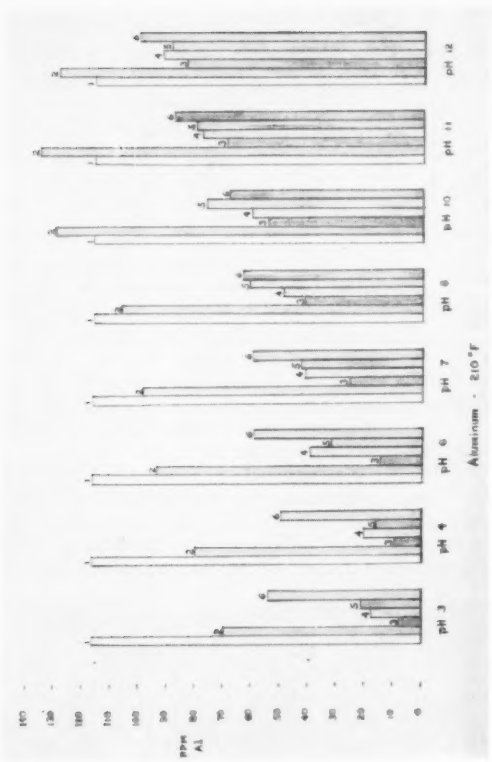


Figure 4

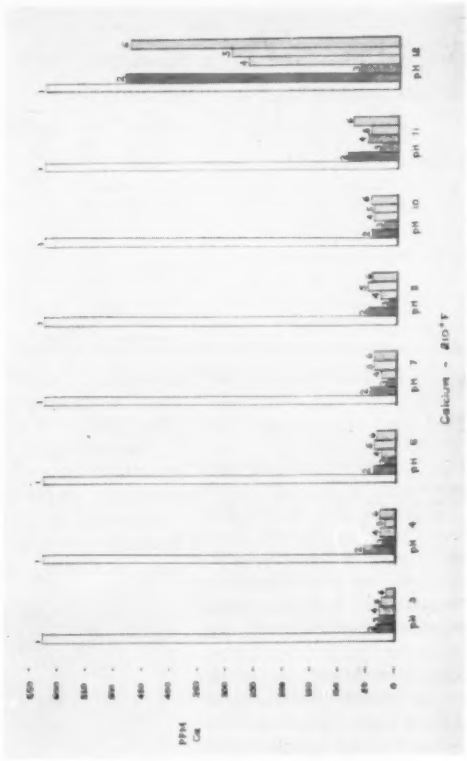


Figure 6

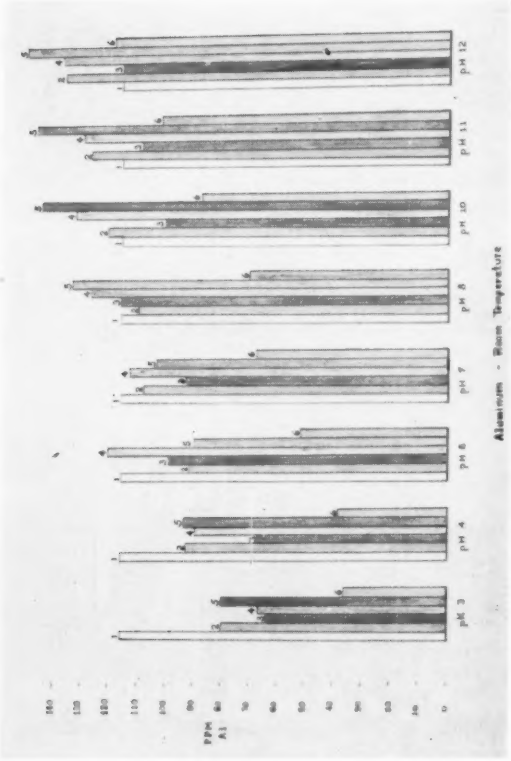


Figure 3

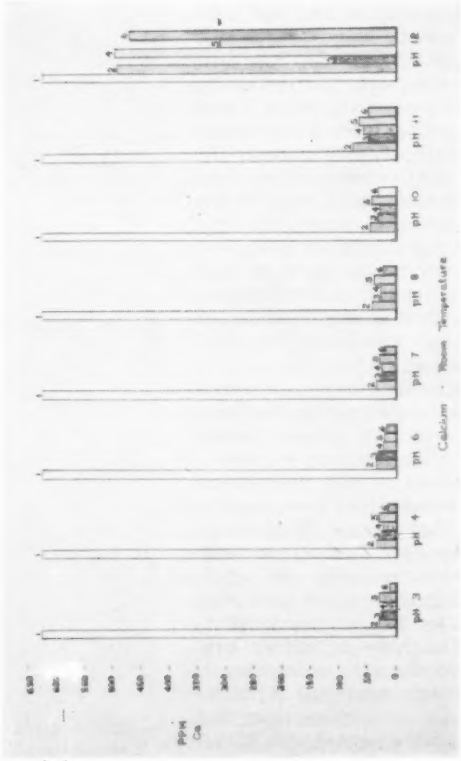


Figure 5

1—Contaminated sample; 2—Blank; 3—EDTA; 4—Na_3HEDTA; 5—Na.DETAPA; 6—$Na_4P_2O_7$

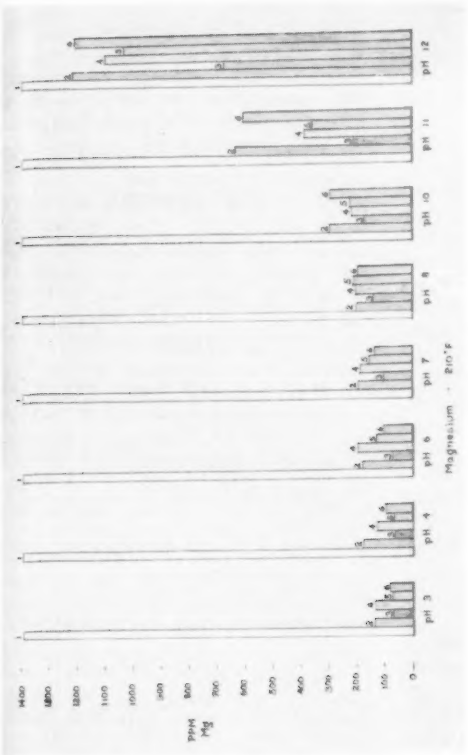


Figure 8

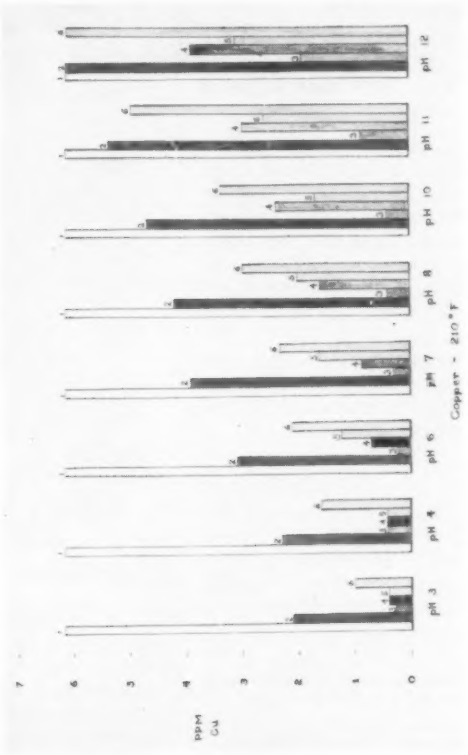


Figure 10

1—Contaminated sample; 2—Blank; 3—EDTA; 4—Na_3HEDTA; 5—$Na_5DETAPA$; 6—$Na_4P_2O_{12}$

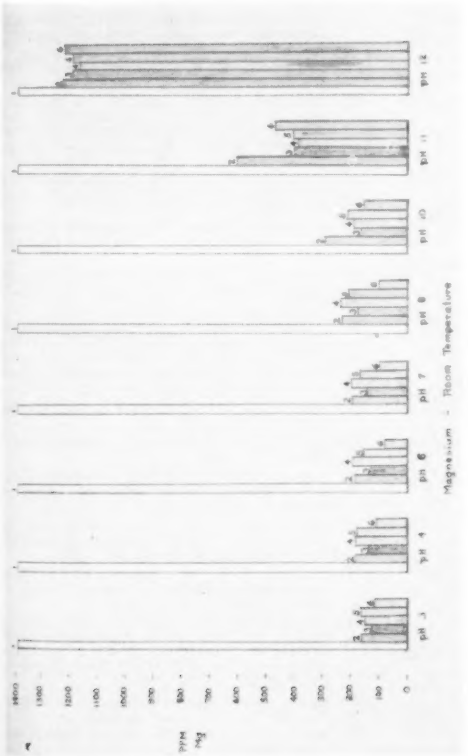


Figure 7

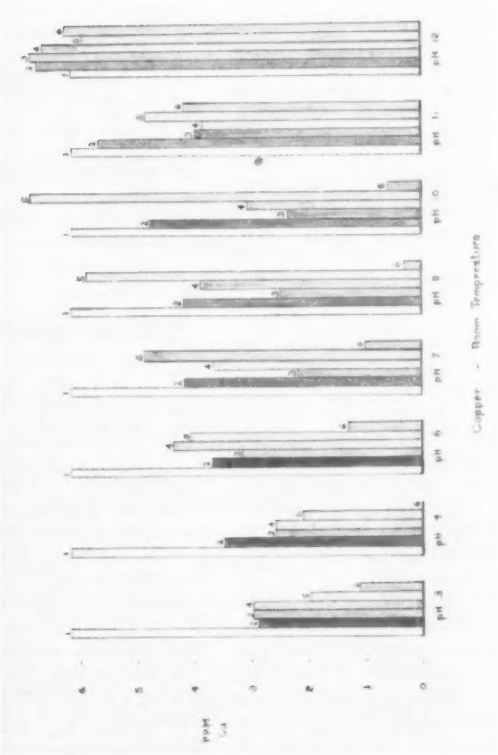


Figure 9

1—Contaminated sample; 2—Blank; 3—EDTA; 4—Na_3HEDTA; 5—$Na_5DETAPA$; 6—$Na_4P_2O_{12}$

SUMMARY

1) All of the chelating agents used except $Na_6P_4O_{13}$ are far more effective at 210°F than at room temperature.

2) The effectiveness of the chelating agents for calcium and magnesium at 210°F over that at room temperature is not as pronounced as it is for the other metals. With Na_3 HEDTA and Na_5 DETAPA there is but slight improvement at 210°F over room temperature. With EDTA, the improvement is also slight until the pH rises above 10. Here the increased efficiency at 210°F becomes more pronounced.

3) In general the efficiency of the chelating agents at both temperatures decreases as the pH increases, dropping sharply at pH levels above 10. Again calcium and magnesium are somewhat the exception. The efficiency of EDTA for chelating calcium increases with an increase of pH up to 10 at room temperature and pH 8 at 210°F. Beyond these levels, the efficiency drops quite sharply. With Na_3HEDTA and Na_5DETAPA the effectiveness for calcium is maintained at about the same level throughout the pH range as high as 8 to 10. Beyond this, as with EDTA, the effectiveness drops quite sharply.

   It appears that the drop in effectiveness for magnesium as the pH rises is not as pronounced as for other metals, excluding calcium. With EDTA, Na_3HEDTA, and Na_5DETAPA, the efficiency for magnesium drops only slightly as the pH is increased to 10. As is true for calcium, beyond this point the efficiency drops sharply.

4) At room temperature, $Na_6P_4O_{13}$ and EDTA appear to be more effective throughout most of the pH range, although as the pH increases above 10, the difference among the four chelating agents used becomes less apparent. At pH levels below 8, $Na_6P_4O_{13}$ seems to be superior for most metals especially iron, aluminum, and copper.

   At 210°F EDTA seems to be the most effective although there may be specific metals at certain pH levels where one of the other chelating agents is superior. $Na_6P_4O_{13}$ is somewhat less effective than the others, but it should be noted that it still retains a considerable amount of efficiency even under these conditions, where conversion to orthophosphates may be expected to take place.

Due to the time factor involved, this paper is extremely limited in its scope and merely establishes certain basic trends. It also points the way to further work such as investigations with different chelating agent types, different temperatures and time increments, and in the presence of different media such as kier boiling and bleaching baths.

This type of investigation entails a tremendous amount of analytical work, and therefore this paper also serves to illustrate the value and utilization of spectrographic analysis as a means of carrying out such a study.

CONCLUSIONS

This paper has shown the individuality of the chelating agents studied; and, therefore, it is necessary to refer to the body of the paper for specific information. The following general conclusions can be made:

1) Chelating agents are effective in the removal of cations from cotton fabric.
2) All of the chelating agents studied are more effective at low pHs.
3) The organic chelating agents are more effective at high temperatures.
4) The sodium tetraphosphate is more effective at room temperature.
5) At room temperature sodium tetraphosphate was found to be the most effective chelating agent.
6) At elevated temperatures the organic chelating agents are most effective.
7) EDTA was the most effective of the organic chelating agents studied.

ACKNOWLEDGMENTS

American Cyanamid Co
American Fabrics Co
Arnold, Hoffman & Co, Inc
Ciba Co, Inc
Cranston Print Works Co
Crown Chemical Co
New Bedford Institute of Technology
Owens-Corning Fiberglas Corp
Revere Copper and Brass, Inc
Rumford Chemical Works
Sandoz, Inc
Chas S Tanner Co
University of Rhode Island
U S Department of Agriculture

The Committee wishes to give special recognition to Owens-Corning Fiberglas Corp and Chas S Tanner Co for their contributions.

REFERENCES

(1) Pitts, L "Sequestering Agents in Dyeing", *Dyer 118*, 260 (1957).
(2) Millson, H E, "Sequestering Agents in Wool and Cotton Dveing", *Am Dyestuff Reptr 45*, 66-81 (1956).
(3) Taylor, E M, "Factors Influencing the Successful Application of Direct Dyes", *ibid 45*, 381-4 (1956).
(4) Bird, C L, and Molloy, E, "The Prevention of Dull Shades Due to the Presence of Iron in the Dyebath when Dyeing with Chrome Dyes", *J Soc Dyers Col 55*, 560-4 (1939).
(5) Campbell, M V, "The Dyeing of Direct Cotton Dyes on Fibro Carpet Yarns in Hard Water", *ibid 66*, 120-31 (1950).
(6) Millson, H E, "Wool Dyeing: Sequestering Agents", *J Textile Inst 42*, A468 (1951).
(7) Smith, R L, "The Properties and Applications of Sequestering Agents", *Dyer 115*, 667 (1956).
(8) Summersgill, J V, "Some Aspects of the Chemistry and Textile Uses of Sequestering Agents", *J Soc Dyers Col 70*, 278-83 (1954).
(9) Gard, A J, "Chemistry of Chelation in Textile Processing", *Am Dyestuff Reptr 42*, 867-70 (1953).
(10) Singer, J J, and Bersworth, F C, "Organic Complexing Agents in Textile Processing", *ibid 41*, 365-9 (1952).
(11) Southeastern Section, AATCC, "The Effect of Iron and Copper Contaminants on Cotton Degradation in Peroxide Bleaching", *ibid 47*, 79-83 (1958).
(12) Zussman, H W, "Sequestering Agents: Their Use in Textile Processing", *ibid 38*, 500-4 (1949).
(13) Walker, A C, and Quell, M H, "Naturally Occurring Ash Constituents of Cotton", *J Textile Inst 24*, T131-44 (1933).
(14) Nickerson, R F, "Cotton Fibers", *Ind Eng Chem 32*, 1454-62 (1940).
(15) Piedmont Section, AATCC, "A Comparison of the Dyeing Characteristics and Related Properties of Rain-grown and Irrigated Cotton", *Am Dyestuff Reptr 39*, 901-11 (1950).
(16) Wakeham, H, "Cotton Quality and Fiber Properties", *Textile Research J 26*, 925-36 (1956).
(17) McCall, E R, and Jurgens, J F, "Chemical Composition of Cotton", *ibid 21*, 19-21 (1951).
(18) Hoffpauir, C L, "Cotton's Minor Constituents", *Textile Inds 116*, #8, 109-13 (1952).
(19) Heinzelman, D C, and O'Connor, R T, Trace Metals in Cotton Fiber", *Textile Research J 20*, 805-7 (1950).
(20) Timm, J A, "General Chemistry", MacGraw-Hill, NY, 1944.
(21) Daniels, F, "Outlines of Physical Chemistry", Wiley, NY, 1948.
(22) Brode, W R, "Chemical Spectroscopy", Wiley, NY, 1939.
(23) Harvey, C E, "A Method of Semiquantitative Spectrographic Analysis", Applied Research Laboratories.
(24) Van Wazer, J R, "Phosphorus and Its Compounds", Vol I, Chapters 8 and 10, Interscience Publishers, NY, 1958.
(25) Wachter, A R, "Modification of Cellulose by Chemical Means", *Papers AATT 8*, 135-40 (1953).
(26) Chaberek, S, Bersworth, F C, and Martell, A E, "Chelating Agents as Metal Buffers in Biological Systems. I—Principles and Use of EDTA", *Arch Biochem Biophys 55*, 321-37 (1955).
(27) Anon, "Keys to Chelation", Dow Chemical Co.
(28) Anon, Tech Bulletin on Versenex 80, Dow Chemical Co.

RAYMOND W JACOBY

RAYMOND W JACOBY, 8th Olney Medalist and a past president of AATCC, died Monday December 14, in Raleigh, NC at the Rex Hospital in that city, while on a business trip. Funeral services were held at the Community Church in Mountain Lakes, NJ, where he had made his home for a number of years.

Mr Jacoby served as president of AATCC during the years 1955-56, and it was in 1956 that he also served as general chairman of the Perkin Centennial, an observance of the 100th anniversary of the discovery of the first aniline dyestuff by William H Perkin. The Perkin Centennial, sponsored by AATCC, saw 27 participating societies and cooperating Government departments. Mr Jacoby also served AATCC as a vice president and Councilor.

In addition to his duties as a Councilor, Mr Jacoby also was serving on the following AATCC Committees at the time of his death: Appropriations, Publications, Archives, Intersociety Relations, Technical Committee on Research, Textile Education, Colour Index Supplement Editorial, and Study Committee on Endowment Fund.

He was a member of Rhode Island Section, which he served as chairman in 1948.

Since his retirement from Ciba Co Inc in 1956, Mr Jacoby has served as a consultant; a teacher at North Carolina State College School of Textiles, Raleigh, NC; and dyeing and finishing editor of *Modern Textiles* magazine.

RAYMOND W JACOBY
(1889 - 1959)

Born in Wilkes-Barre, Pa, July 10, 1889, Mr Jacoby attended the local high school, and was graduated from Massachusetts Institute of Technology in 1910 with a BS in chemistry. He embarked on his textile career with Glenlyon Print Works. He later joined Rockland Finishing Co as assistant manager, went with U S Finishing Co as manager, and then to Arkwright Finishing Co as superintendent. He joined Ciba in 1937, serving primarily as New England manager in Providence, RI.

Mr Jacoby was presented the eighth impression of the Olney Medal in 1951. At that time, Elliott Broadbent, president, Glenlyon Print Works Div, Sayles Finishing Plants, Inc, spoke on "The Medalist—The Man"; and W George Parks, Univ of Rhode Island, current AATCC vice president, New England Region, spoke on "The Medalist"—The Scientist".

These addresses, which cover Mr Jacoby's career up to 1951, as well as Mr Jacoby's address upon receiving the Olney Medal from then president Norris Rabold, appear in the October 29, 1951 issue of *American Dyestuff Reporter*, pages P698 to P703.

Survivors include his widow, Alice, who lives at Lake Intervale, Parsippany, NJ; two sons, John of Chelmsford, Mass, and Charles of Falmouth, Mass; a daughter, Mrs David Barnes of Tampa, Fla; a sister, Mrs John Lewis of Holidaysburg, Pa; and nine grandchildren.

AATCC Deceased

JAMES W MONKS
General Manager
Poughkeepsie Dyestuff Corp
Poughkeepsie, NY

HERBERT E POORE
Manager
Chelten Dye Works
Philadelphia, Pa

JOHANNES G WEELDENBURG
Executive Vice President
Algemene Kunstzijde Unie NV
Arnhem, Holland

AATCC Calendar

COUNCIL, COUNCIL COMMITTEES, RESEARCH COMMITTEES
Jan 21-22 (Hotel Sheraton-Atlantic, New York, NY); Jan 21—Council Committees and Research Committees; Jan 22 (AM)—ECR, TCR; Jan 22 (PM)—Council
May 12-13 (Hotel Sheraton-Atlantic, New York, NY); May 12—Council Committees and Research Committees; May 13 (AM)—ECR, TCR; May 13 (PM)—Council

NATIONAL CONVENTIONS
Oct 6-8, 1960 (Sheraton Hotel, Philadelphia, Pa); Sept 28-30, 1961 (Buffalo, NY); 1962 (Southern Region)

DELAWARE VALLEY SECTION
Jan 22 (Kugler's Restaurant, Philadelphia, Pa)

HUDSON-MOHAWK SECTION
Jan 15, Mar 27 (Chelsea House, Tribes Hill, NY); May 20 (Ladies Night); June 24 (Annual Outing)

METROPOLITAN SECTION
Jan 15, Feb 19 (Hotel New Yorker, New York, NY); Mar 18, Apr 22 (Kohler's Swiss Chalet, Rochelle Park, NJ); May 20 (Ladies Night—Swiss Chalet); June, 1960 (Outing)

MID-WEST SECTION
Feb 6 (Bismarck Hotel, Chicago, Ill; June 18 (Outing, Cerami's Island View Resort on Browns Lake, Burlington, Wis)

NORTHERN NEW ENGLAND SECTION
Jan 15 (Joint symposium with ASME Textile Engineering Div, Woodlawn Golf Club, Newton, Mass)

PACIFIC SOUTHWEST SECTION
Jan 9 (dance); Feb 5, Mar 18, May 13 (meetings); July 16 (picnic); Sept 24-25 (outing); Nov 18 (meeting); Dec 10 (dance)

PIEDMONT SECTION
Jan 22-23 (Poinsett Hotel, Greenville, SC); Apr 2-3 (Hotel Robert E Lee, Winston-salem, NC); June 3-4 (Outing—Ocean Forest Hotel, Myrtle Beach, SC); Sept 23-24 (Hotel Charlotte, Charlotte, NC)

RHODE ISLAND SECTION
Jan 29 (Johnson's Hummocks); Mar 25 (Providence Engineering Soc); Apr 29 (Student Night); June 24 (Outing—Metacomet Country Club); Sept 23 (Management Night); Oct 28 (Providence Engineering Society); Dec 2 (Annual Meeting—Johnson's Hummocks)

SOUTH CENTRAL SECTION
Feb 7 (Hotel Patten, Chattanooga, Tenn); May 13-14 (Outing—Riverside Hotel, Gatlinburg, Tenn); Sept 10, Dec 9 (Hotel Patten, Chattanooga, Tenn)

SOUTHEASTERN SECTION
Feb 13, Apr 16 (Ida Cason Callaway Gardens, Pine Mountain, Ga); June 10-12 (Outing--Radium Springs Lodge, Radium Springs, Ga); Sept 10, Dec 3 (Atlanta Athletic Club, Atlanta, Ga)

WESTERN NEW ENGLAND SECTION
Jan 15, Mar 14 (Rapp's Restaurant, Shelton, Conn); Apr 8 (Hartford, Conn, area); May 6 (Ladies Night, Rapp's Paradise Inn, Ansonia, Conn); June 10 (Outing, Wallingford Country Club—tentative); Sept 23 (Blake's Restaurant, Springfield, Mass); Oct 21 (Annual Meeting, Rapp's Restaurant, Shelton, Conn); Dec 2 (Rapp's Restaurant, Shelton, Conn)

1959 Convention Papers

"Fluorescent Brighteners and Bluing Agents in Wool Processing"—Delaware Valley Section

"The Consumers' Reaction to 'Wash-and-Wear'"—Genevieve M Smith, Sears Roebuck and Co

"New Developments in Evaluating 'Wash-and-Wear' Performance"—James R Bercaw, E I du Pont de Nemours & Co, Inc

"Man-made Cellulosic Fibers in 'Wash-and-Wear'"—A B Hilton, G V Lund, and A E Martin Jr, Courtaulds (Alabama) Ltd

"Retrospect and Prospect: Progress and Problems in 'Wash-and-Wear'—Preliminary Report"—Pauline B Mack, Marguerite C Barra, Attelia L Muller, and Elizabeth F Thomas, Texas Woman's Univ

"Recent Developments in Finishing of Blends"—Henry H Latham, Arkansas Co, Inc

"Recent Advances in the Technology of Dyeing Blends Containing Dacron Polyester Fiber"—Paul L Meunier, E I duPont de Nemours & Co, Inc

"Dyeing and Finishing Special Blends of Arnel with Acrylics and Arnel with Cotton in Circular Knit Application"—Ralph E Lacy and Jack A Dayvault, Celanese Fibers Co

"Recent Advances in the Pressure Beam Dyeing of Synthetic Fabrics"—Walter J Newcomb, Gaston County Dyeing Machine Co, and George C Ward, Celanese Fibers Co

"Twelve Million Yards of Natural and Man-made Fibers Dyed on the Swedish Pad-Roll Dyeing Machine" Robert M Lesh, Northern Dyeing Corp

"The Monforts Reactor—A New, Continuous Dyeing machine"—Joachim C Roehl, A Monforts Machine Works

"Dyeing Blends of Dacron Polyester Fiber and Cotton by the Du Pont Thermosol Process"—J J Iannarone and W J Wygand, E I duPont de Nemours & Co, Inc

Papers Presented before Local Sections

"The I-T Process for Applying Cationic Dyes to Acrylic Fibers"—J A Leddy, Geigy Dyestuffs

"Chemical Principles of Dyeing and Finishing"—Robert A Brooks, E I duPont de Nemours & Co, Inc

"Production of Man-made Fibers"—S L Hayes Jr, E I duPont de Nemours & Co, Inc

"New Developments in Dyeing and Printing Polyester Fibers"—Dorel Marian, Compagnie Francaise des Matieres Colorantes

"Dyeing Dacron by Emulsions of Solvent Solutions of Dyes"—Robert J Peirent, James Casey and Georgia Dadoly, Lowell Technological Institute

"New Horizons for Pigment Printing"—Norman S Cassell, Interchemical Corp

"Finishing Blends of Orlon and Cotton in Underwear"—Herbert T Pratt, E I du Pont de Nemours & Co, Inc

"Orlon Cantrece—Du Pont's Newest Sweater Fiber"—Herbert T Pratt, E I duPont de Nemours & Co, Inc

"Areas for Nonwoven Fabrics Advancement"—Paul A Homier, Callaway Mills Co

"Styling and Decorating Acetate Nonwovens"—E L Clements, H W Coates, and C E Layman, Celanese Fibers Co

"Properties of Acrilan Nonwoven Fabrics as a Function of Fiber Length, Denier and Binder Content"—D C Nicely, The Chemstrand Corp

"Laboratory Tested and Approved"—P J Fynn, J C Penney Co

Future Papers

The following list is comprised of titles of papers submitted to date for publication in future issues of the Proceedings. Authors and Technical Program Chairmen are requested to examine this list and call our attention to any omissions.

Elected to Membership

November 5, 1959

No designation after name indicates Senior
(A) indicates Associate
(J) indicates Junior
(S) indicates Student
*indicates transfer from another class of membership

NEW ENGLAND REGION

Northern New England Section

George E Melancon
Eric Thorp

CENTRAL ATLANTIC REGION

Metropolitan Section

Mario L Fillippeli Sr
Eugene J Grady *
Francis B Percarpio *
James M Polito *
Gerard M Weiss *

Delaware Valley Section

Charles J Spanninger III (J)

Niagara Frontier Section

Francis Serda Bernat *

WESTERN REGION

Mid-West Section

Walter Gonet *
Frances T Libbey *

SOUTHERN REGION

Washington Section

Josephine M Blandford
Abraham Fookson

Piedmont Section

Floyd O Childers
William M Outland
James M Buckner Jr *
Joe F Mattison *

Southeastern Section

Horace M Robinson Jr *

STUDENT CHAPTER

Alabama Polytechnic Institute

Glenda Ree Bolton (S)
Louis F Bone (S)
Leland E Glass (S)
Larry M Hanks Jr (S)
Holland L Helton Jr (S)
Charles A Maddox (S)
Robert J McInnish (S)
Lawrence L Milner (S)
Wade G Shores (S)
Billy D Snell (S)
Lynda Stewart (S)
Raymond C Styres (S)
Clifford L Talley (S)
Jimmie C Walker (S)

UNCLASSIFIED

Bobbi M Tremain (S)

ACTIVITIES OF THE LOCAL SECTIONS

Delaware Valley

JACK DAYVAULT, development chemist for the Celanese Fibers Co, spoke on the subject "Dyeing and Finishing Special Blends of Arnel with Acrylics and Cotton in Circular Knit Application" at the Dec 4 meeting of the Delaware Valley Section held at Beck's-on-the-Boulevard, Philadelphia, Pa.

Mr Dayvault discussed and demonstrated the role of dye selection, pH control, surfactants, accelerants and retarders. An increased scope of color style through piece dyeing is said to be possible because of the differences of dyeing properties of Arnel, Orlon and cotton. Commercial one-bath processes have been developed for dyeing Arnel/Orlon and Arnel/cotton knit fabric into a range of union, reserve effect and cross-dyed shades.

•

Metropolitan

RAYMOND THORNTON, technical service manager of Arnold, Hoffman, & Co, Inc presented a paper entitled, "Procinyl Dyestuffs, Novel Disperse Reactive Dyestuffs for Nylon," before the Metropolitan Section on November 20 at Kohler's Swiss Chalet, Rochelle Park, NJ.

Mr Thornton stated that conventional dyes for nylon have suffered, hitherto, from the disadvantage that those of good fastness properties do not readily cover the chemical and physical irregularities of the fiber, while those which are free from these defects have relatively low fastness properties. The Procinyls, a new range of reactive dyes for nylon, are disperse dyes which can be applied in an unreactive form under acid conditions. Under these conditions, they are said to possess the level-dyeing properties of disperse dyes. When the bath is made mildly alkaline, it is claimed that reaction occurs between dye and fiber, and a fast, level dyeing is obtained. It was stated that these dyes react with both the amine end-groups and the amide groups in the fiber, and thus difficulties associated with saturation of amine end-groups are not encountered. Rates of dyeing and fixation of the dyes have been determined both separately and in mixtures, and it was stated that the dyes are compatible for dyeing as mixtures. Rate-of-dyeing curves indicate that these dyes behave as medium - to - slow - dyeing disperse dyes. As with Procion dyes for cellulose, a side reaction occurs in the dyebath, and in this case the deactivated dye remains on the fiber after the soaping treatment. It was stated that, since this unfixed dye has fastness properties at least equal to conventional disperse dyes, this small proportion can be tolerated without undue loss of fastness. Mr Thornton concluded by stating that, for the first time, a range of dyes is available for dyeing nylon to level, attractive colors with good wet fastness properties using a simple technique and conventional dyeing machinery.

Raymond P Thornton, guest speaker at Metropolitan Section's November 20 meeting

* * *

Results of the recent election to Metropolitan Section offices have been announced by Richard P Monsaert Jr, Secretary.

Chairman John A Komninos, Waldrich Co; Vice Chairman P J Fynn, J C Penney Co; and Secretary Richard P Monsaert Jr, American Felt Co, were reelected without opposition.

For the post of treasurer, Eugene J Grady, Jacques Wolf & Co, defeated Richard E Kimble, Kimtex Service Labs, Inc, 247 to 103.

Five candidates vied for the four openings on the Sectional Committee, with the following result: P J Wood, Royce Chemical Co, 317 votes; Harry Moore, Fair Lawn Finishing Co, 304; Max W Winkler, American Cyanamid Co, 295; Emil C Hansen, General Aniline & Film Corp, 266; Donald E Marnon, Otto B May, Inc, 238.

Three new members on the Metropolitan Section's seven-man delegation to the Council were elected. Edwin I Stearns, American Cyanamid Co, was unanimously elected to serve for one year. In a contest for two seats for three-year terms, the result was as follows: Richard E Miller, Eastman Chemical Products, Inc, 239 votes; William A Holst, National Aniline Div, 196; Albert E Johnson, National Institute of Drycleaning, 184; Adolph G Dabal, The Tanatex Chemical Corp, 86.

•

Northern New England

THE internal geometry of fabric is the important factor in achieving wool-like properties in blends, according to Norman R S Hollies, research supervisor, Harris Research Laboratories, Inc, Washington, DC. He stated that mixtures with the maximum amount of fiber disorientation lead to wool-like properties in blends and this can be achieved by factors promoting randomness in fibers, yarns, and fabrics. It matters little which synthetic fibers are used, so long as the internal geometry of a wool fabric is achieved.

Speaking before ninety-six members and guests at the Annual Meeting of the Northern New England Section on December 4 at Motel 128, Dedham, Mass, Dr Hollies presented a summation of the efforts of a number of groups working for the armed services in an attempt to achieve wool-like properties in blended fabrics in the event of a wool shortage due to a national emergency. The impressive results of the work were demonstrated by Army shirts made with varying percentages of synthetic fiber and wool when compared with the standard wool garment. Dr Hollies posed three questions that came to mind when attempting to achieve wool-like properties in fabric blends:

1) What trends occur with changes in fiber blends only?
2 What yarn and fabric properties can be identified as wool-like?
3) What changes in fiber, yarn, or fabric construction and finishing contribute to wool-like blends?

He stated that success in achieving wool likeness is found in the answers:

1) Wool likeness is characterized by randomness of fiber arrangement.
2) It can be measured by thickness

vs pressure and by water flow resistance.

3) It can be achieved by factors promoting randomness in fibers, yarns, and fabrics, and in woolens by extensive fulling.

Chairman Robert D Robinson presided at a business meeting which preceded Dr Hollies talk. Reports were presented by Secretary Joseph S Panto and Treasurer William W Pennock.

A Maurice Campbell, chairman, Nominating Committee, presented a slate of nominees for office in 1960, which was accepted. The following were elected: *Chairman*—Robert D Robinson, Bachmann-Uxbridge Worsted Co; *Vice Chairman*—Edward J McNamara Jr, Hamilton Chemical Co; *Secretary*—Joseph S Panto, Fabric Research Laboratories, Inc; *Treasurer*—William W Pennock, E I du Pont de Nemours & Co, Inc; *Councilors*—Gerald F Quigley, Agawam Dye Works, Inc; Robert J Peirent, Lowell Technological Inst; John J O'Neill, Dow Corning Corp; *Sectional Committeemen*—Bennett S Gesmer, Dyecraftsmen, Inc; Herbert L Ortstein, J P Stevens & Co, Inc; Daniel Frishman, Malden Mills; Donald H Thomas, National Aniline Div. John R Markgren, W C Durfee Co, Inc, was named chairman of the Dining Committee.

The Section will hold a joint meeting with ASME on January 15 at the Woodlawn Golf Club, Newton, Mass, at which time Dr Frishman will speak on "Pile Fabrics", the subject of the Section's first-prize-winning 1959 Intersectional Contest paper.

•

Pacific Southwest

INCOMING and outgoing officers of the Pacific Southwest Section held an informal meeting recently at Raffels, Los Angeles, Calif. Purpose of the meeting was to acquaint the new officers with their duties, discuss other business of the Section, and set up a tentative calendar for 1960 (see AATCC Calendar for dates).

For 1960, Walter E Kramer succeeds Paul F Noonan as chairman, Angus H Roberts succeeds Mr Kramer as vice chairman, Richard C Demuth succeeds Thomas P Lee as secretary, and David D Sanders succeeds Theodore B Smock Jr as treasurer.

•

Rhode Island

RHODE ISLAND SECTION held its annual business meeting December 4 at Johnson's Hummocks Grill, Providence, RI, with 90 in attendance.

Harold C Harrison, guest speaker at Rhode Island Section's December 4 meeting

Speaker of the evening was Harold C Harrison, professor of chemistry, and assistant director, Laboratories for Scientific Criminal Investigation, Univ of Rhode Island. His subject was "Scientific Criminal Investigation".

During the business session, the secretary and treasurer presented oral reports.

Officers for 1960 were elected as follows: *Chairman:* Robert Phillips; *Vice chairman*—John Roarke; *Secretary*—Richard Dugdale; *Treasurer*—Harold Sturtevant; *Councilors*—Raymond Taylorson, Arthur McLean; *Sectional Committeemen* — Fred Kinch, Fernand Schlaeppi, William Aldrich, William Cooney.

•

Southeastern

APPROXIMATELY 115 members and guests attended the December 5 meeting of the Southeastern Section at the Atlanta Athletic Club, Atlanta, Ga. Arrangements for the meeting were handled by Richard L Stephens, E I duPont de Nemours & Co, Inc.

A round-table discussion, led by Leon Tigler, Eagle & Phenix Div, Reeves Bros, was held in the morning. Topic under discussion was "Preparation of Fabrics for Dyeing".

Speaker at the afternoon technical session was Robert A Brooks, the Du Pont Co, on the subject, "Chemical Principles of Dyeing and Finishing".

The following officials were reelected for 1960: *Chairman*—Robert B Hallowell; *Vice chairman*—William B Amos; *Secretary*—Warren E Tiller; *Treasurer*—Leon Tigler.

William E Fayssoux and Joseph W Richardson were reelected Councilors, and John C Cook, W R C Smith Publishing Co, was elected to succeed T Howard McCamy.

The following Sectional Committeemen were elected: Benjamin H Brinkley Jr, Avondale Mills; Stanley T Holland, American Cyanamid Co; Nicholas S Dunten, William Carter Co; and William Postman, Georgia Inst of Technology.

Chairman Hallowell named the following committee chairmen: *Outing*—J Elwood Barbre, Pepperell Mfg Co; *Student Chapter*—Richard L Stephens, Du Pont Co; *Corporate Membership*—C Russell Gill, Arnold, Hoffman & Co Inc; *Individual Membership*—Kenneth E Miller, Augusta Chemical Co; *Auditing*—Marc V Shivers; *Custodian*—A Kempton Haynes, Rohm & Haas Co; *Publicity*—George H Dockray, W R C Smith Publishing Co; *Scholarship*—H Gillespie Smith, American Cyanamid Co; and *Standing Research*—Cecil B Ray, Pepperell Mfg Co.

A revised schedule of 1960 meeting dates for the Southeastern Section appears in the AATCC Calendar in this issue.

IMPORTANT NOTICE

To all Manufacturers of Dyes, Resin-Bonded Pigment Colors, and Textile Chemical Specialties:

The Tabulation of American Dyes, Tabulation of American Resin-Bonded Pigment Colors, and list of Textile Chemical Specialties in the *Technical Manual of the American Association of Textile Chemists and Colorists* are being revised and brought up to date for the 1960 edition of this book. Notices have been mailed to manufacturers of these products explaining what information is required and the form in which it is to be submitted. If you have not supplied information about your products, please do so promptly. The deadline for receipt of information by the undersigned is Jan 15 for dyes and resin-bonded pigments. The deadline for textile chemical specialties was Dec 15. Detailed directions for supplying information will be sent promptly on request.

W D Appel, Editor, *Technical Manual*,
9101 Jones Mill Road,
Chevy Chase 15, Maryland.

DECEMBER DESCANT
1959

Inter Alia—Inter Nos

P J WOOD

ANOTHER COUNTY HEARD FROM

And a big county at that; the biggest county in England---Yorkshire.

From what is ostensibly the first number of a new technical magazine, the "New Zealand Textile Journal" (quarterly), we learn that a new type of sheep's wool seems to be assuming prominence. This is a fiber coming from a hitherto little known breed of sheep, the Swaledale.

It seems that the fibers from this typically Northern breed of Moorland sheep, up to quite recently, have been used, almost exclusively, for fabrics of the rough-tweed type usually manufactured from the coarse Highland or Donegal wools; but now, after extensive research work carried out at the Bradford Institute of Technology, it has been found possible to produce a range of worsted cloths from heavy coatings to lightweight dress fabrics; this bids fair to extend the usefulness and spread the fame of this sturdy fiber.

It is astonishing to discover that there are about two million of these Swaledale sheep in the Northern counties; the flocks outnumber any other hill and moorland breeds.

How many people have even heard of Swaledale? The Swale is one of the tributaries of the Yorkshire river Ouse, the others being the Yore or Ure, the Nidd, the Wharfe, the Aire, the Derwent and the Trent. The Ure, Nidd, Wharfe and Derwent are grand fishing rivers, the angler's paradise, trout galore, while the Aire is in the heart of the West Riding woolen manufacturing district, Airedale being the original home of the Airedale dog; the Trent has, as one of its riparian cities, Burton-on-Trent, the birthplace of Bass' Ale. Woops!

May we wish our new but distant contemporary success in this new venture.

FROM OUR WELL-INCLINED, AMICABLE, KINDLY AND SOCIABLE FRIENDS

Some issues ago, we reminisced regarding the days of our extreme youth and the delectable and reasonably priced candies then available. This brought forth a response in kind from two old friends, one of whom was Al Sampson and the other wasn't. Thanks are due to these estimable gentlemen for demonstrating to us that the goodies whereof we spoke are by no means a thing of the past; the children of today are still enjoying the same or similar treats. Dunk Culberson, an AATCC member belonging to the Pacific Southwest Section, sent us a few words of appreciation which were not lost on this writer; he enclosed a copy of his own literary exertion, the "Brazos River Potpourri", which he publishes once in a while, as the spirit moves him. A second copy of this journal arrived yesterday, for which we are truly thankful. Another member of the same faraway section, Steve Luscian, who was recently transferred to Los Angeles, seems to be approaching acclimation, but his letter leads us to suspect that he yearns, at times, for the "fleshpots of Egypt" as it were, so to speak. We miss you too, Steve, and we trust that, on your trips back East, you may be able to synchronize your visit with one of the meetings of Metropolitan Section and spread your benign smile over your many friends here. Steve would like to know of anyone that could go out to LA and give a lecture before that section, some one wealthy enough to go out at his own expense, as the funds of that small section are not unlimited. An airmail letter from M Lipson telling us where we could get a copy of the proceedings of the recent S D C Symposium held in Melbourne; Dr Lipson is chief of the Division of Textile Industry of the Wool Research Laboratories, Commonwealth Scientific and Industrial Research Organization at Geelong, Australia.

A short letter from Christopher Young informing us that he had just got back from a European trip visiting several countries and winding up with a look-in at the Milan Textile Machinery Exhibition. Says he, "The accent in the finishing machinery was all for open width, which we have specialized in for many years. For washers there were vibrators or agitators of many kinds, mechanical or jet. I'm not so taken with the last except as a means of hastening oxidation of vats on cellulosic fibers when air is pumped in instead of water." Mr Young was manager of the dyeing and finishing department at Binny & Co in Madras, India for many years.

A short note from E J "Gus" Davies informs of the phenonemally hot weather they had in the north of England this past summer and gives us the new address of the Dyers and Cleaners Research Organization, of which he is director. It has been moved from Leeds to Harrogate, about 15 miles; it used to be a nice proving distance for all new bicycles in the old days. Braggarts would swear they did the distance in one hour flat, in spite of the fact that there was one steep hill that was a regular heart-breaker, Harewood Hill, pronounced Harwood by the well informed. The Earl of Harewood married the Princess Royal, which brought a royal personage into the area handy for opening local bazaars, acting as patroness for all sorts of activities, etc, etc. She served as Chancellor of Leeds University for a time.

ABSENTEEISM AMONG FEMALE EMPLOYEES

The French Journal, "Le Mois Textile" (The Textile Month) publishes the very interesting results of an investigation carried out by "Centre d'etudes sociologiques" (Sociological Study Center) of France on the matter of absenteeism among women in textile establishments.

This research covered eight establishments, in the vicinity of Paris, having a total of 8,049 employees. The conclusions of the investigation were briefly as follows:

1) Absenteeism of women (7.1%) exceeded by 88% that of men (3.77%).

2) Contrary to the masculine absenteeism, that of the women increased with the distance of home from the factory.

3) Men exhibited an absenteeism which was practically stable throughout their working life. In the case of women there were numerous deviations: absenteeism was as high as 18.07% between the ages of 20 to 24 years; the rate sank gradually until it reached 3.54% at the age of 60 years, at which point it approached closely that of the men: 3.72%.

4) Absences of married women having children under 14 years old exceeded those of others 13.5% to 5.3%.

5) The degree of absenteeism among mothers of families varied according to the age of the youngest child: those having children under three years old, 24.75%; those whose children were from three to six years old, 8.71%; and those having children between six and 14 years old, 6.02%.

6) The length of the working week had more influence on absenteeism of women than on that of men; it amounted to 4.78% for a work week of 40 hours and less, as against 9.02% for a work week of 48 or more hours.

7) The curves showing masculine and femine absenteeism, as a function of length of service in the organization, are parallel.

8) Absenteeism appears to diminish as monthly earnings increase, but this fact is not clearly proved; men and women alike.

9) It is true for men and for women, the higher the salary, the less they absent themselves.

AGE

In the publication of the Halifax Building Society (the English equivalent of our Building and Loan Association, Elmer), the "Home Owner", is an article by F Dowley, "Life on Borrowed Time". In it the author quotes a story relating part of a discussion on age at a business conference during which an elderly delegate noted for his pithy comments rose and said, "Youth is intoxication: old age - the morning after." There may be a grain of truth here. The words of Eben Stebbin, as quoted by Griff Niblack in the Indianapolis News recently, seem to apply in this connection. Said he, "College homecomings make a man wonder why his fellow alumni have aged so much." As Elmer might say, in his quaint way, "Ain't it the truth."

NEW YEAR RESOLUTION

"Shall we make a new rule of life from tonight: always to try to be a little kinder than is necessary?"

Sir James Barrie "The Little White Bird"------Q.E.F.

INDEX TO VOLUME 48

FOLLOWING is an index of Volume 48, covering the year 1959. In order to comply with postal regulations, it was necessary to change the method of numbering pages in American Dyestuff Reporter, beginning with the February 23 issue (No. 4). It will be noted that, with each issue, the pages are now numbered consecutively, beginning with page one. AATCC Proceedings pages are identified in each issue by headings on the top of each page.

As in the past, this Index is divided into two parts: by subject and by author.

Throughout, numbers in parentheses serve to indicate the issue number. For example, the number 23(13) following a listing would indicate that the subject may be found beginning on page 23 of issue number 13.

Twenty-six issues of American Dyestuff Reporter were published during 1959, as follows:

Issue Number	*Date*
1	January 13
2	January 26
3	February 9
4	February 23
5	March 9
6	March 23
7	April 6
8	April 20
9	May 4
10	May 18
11	June 1
12	June 15
13	June 29
14	July 13
15	July 27
16	August 10
17	August 24
18	September 7
19	September 21
20	October 5
21	October 19
22	November 2
23	November 16
24	November 30
25	December 14
26	December 28

INDEX BY SUBJECT

AATCC-CATCC, Joint Technical Meeting ... 43 (16)
AATCC Committee on Colorfastness to Light, Report on (Norton) ... 48 (16)
AATCC Committee on Colorfastness to Washing, Research Developments—(Lyon) ... 50 (16)
AATCC Committee on Damage Caused by Retained Chlorine, Research Developments———(Aurich) ... 51 (16)
AATCC Committee on Dimensional Changes in Textile Fabrics, Research Development———Warner) ... 55 (16)
AATCC Committee on Evaluation of Desizing Agents Reorganized ... P29 (1)
AATCC Looks Ahead (Sylvester) ... 43 (16)
AATCC Research at Work (AATCC Technical Committee on Research ... P10 (1)
AATCC to the Textile Industry and the Consumer, The Importance of (Johnson) ... P23 (1)
AATCC's Contribution to Industry through Research (Dorn) ... P10 (1)
AATCC's Interlaboratory Statistical Plan, A Report on (Johnson) ... 54 (16)
Abrasion Resistance of Fabrics: Evaluation by Means of the Accelerotor (AATCC Committee on Resistance to Abrasion) ... 127 (19)

ABSTRACTS———
Factors influencing the Dyeing of Acetate Fibers with Disperse Nonionic Dyes ... 42 (2)
A Laboratory Study of Package Dyeing (with Vat Dyes) ... 42 (2)
Pilling: What Can be Done About It ... 42 (2)
Protect Wool in Process ... 42 (2)
Creslan ... 43 (2)
Tricel Succeeds for Industrials and Fillings ... 43 (2)
What Affects Chlorine Retention in Resin-finished Cottons ... 43 (2)
Some Advantages of Cotton/Rayon 80×80 Print Cloth ... 43 (2)
The Diazo Reaction in Dyeing ... 80 (3)
Kodel Polyester Fiber ... 80 (3)
Copper Compounds in Dyestuff Chemistry ... 80 (3)
Some Tests for Distinguishing between Polyamide and Polyester Fibers ... 99 (3)
Staining Technique Utilizes Two-Dye Solution ... 99 (3)
Flameproofing of Textile Fabrics, with Particular Reference to the Function of Antimony Compounds ... 63 (4)
Water-repellent Finishes—Modern Use of Silicones ... 63 (4)
Flame-resistant Finishing of Cellulosic Fabrics with Phosphorus-containing Resins ... 63 (4)
The Influence of Fiber Types on Dyeing Methods (14th John Mercer Lecture) ... 64 (4)
Relationship of Age to Color Vision ... 64 (4)
Some Chemical Foundations of Fast Color Printing ... 72 (7)
Some Experiments on the Effect of Dye, Fiber and Atmosphere on Lightfastness ... 72 (7)
Bleaching of Cottons in Home Laundering ... 48 (8)
Imparting Crease Resistance and Crease Retention to Cotton with APO ... 48 (8)
Fibers and Carpets ... 83 (8)
Textiles and the Drycleaner ... 83 (8)
Problems in Bleaching Cotton Piece-goods ... 84 (8)
Weather and Rot-resistant Finish for Cotton ... 84 (8)
Odor-inhibiting Finish ... 84 (8)
The Influence of Bleaching on Dyeing ... 40 (9)
The Dyeing of the Newer Synthetic Fibers ... 37 (10)
Suspending Action by Detergents (of Soil) in the Presence of Substrate ... 37 (10)
Properties of Eastman's Kodel Polyester Fiber ... 65 (10)
Dynamic Changes in Viscose Fibers ... 66 (10)
Printing Chrome Colors with Emulsions ... 66 (10)
Role of the Dyestuff Technologist ... 66 (10)
In Quest of the Ideal Detergent Formula ... 69 (10)
Some Observations on the Mechanism of Detergency ... 69 (10)
Developments in Dyeing and Dyes ... 61 (12)
The Determination of Damage to Wool Fibers ... 61 (12)
British Score Gains in Man-made Fiber Dyeing ... 62 (12)
The Mechanism of the Dyeing of Polyester Fibers with Disperse Dyes ... 62 (12)
Chemical and Physical Effects of Finishing Cotton with Methylol Derivatives of Ethyleneurea ... 62 (12)
Printing of Nylon Piece Goods ... 63 (12)
The Practical Dyeing of Sweaters Made of Orlon Type 42 Acrylic Fiber ... 63 (12)
Verel in Carpeting ... 63 (12)
Recent Advances in Wool Finishing ... 64 (12)
Rhovyl Polyvinyl Chloride Fibers ... 64 (12)
Partially Acetylated (PA) Cotton ... 64 (12)
Unpleasant Odors from Crease-resist Finishing ... 26 (13)
Acrylonitrile in the Textile Industry ... 26 (13)
Phosphonomethylation of Cotton ... 26 (13)
Curtain Fabrics from Glass ... 49 (15)
Tips on Printing with Metallic Powders ... 49 (15)
How Fiber Structure Affects Cotton Processing ... 49 (15)
Du Pont Dyes for Creslan Acrylic Fiber ... 49 (15)
P-T-F-E: Toughest of All Fibers in Resistance to Chemicals and Heat ... 50 (15)
The Constitution and Properties of Disperse Dyes ... 50 (15)
The Detergent Problem from the Point of View of the Textile Manufacturer ... 50 (15)
Permanence in Book Papers ... 51 (15)
Cellulose and Formaldehyde ... 47 (17)
Emulsion Thickening———Possibilites in Textile Printing ... 47 (17)
Sizing Materials and How They are Removed ... 47 (17)
What's New in Knitted Outerwear? ... 48 (17)
Development of Chlorine Bleaching ... 48 (17)
Allied Steps Up Output of Caprolan Nylon Tire Cord ... 153 (19)
The Action of Enzymes on Sizing Materials ... 153 (19)
A Comparison of Different Types of Surface-active Agents in Laboratory Carbonizing ... 153 (19)
Adsorption of Labeled Sodium Carboxymethylcellulose by Textile Fibers ... 153 (19)
Wash-fast Characteristics of Resin Finishes on Cotton and Rayon Goods ... 154 (19)
DuPont Dyes for Verel Modified Acrylic Fiber ... 154 (19)
FTC Issues Rules for Enforcement of Textile Products Labeling Law ... 176 (19)
For Wash-and-Wear Fabrics, Arnel-Orlon Blends ... 176 (19)
Preparation and Bleaching (of Cotton Goods)——— How Preparation Methods Developed ... 55 (20)
Why Color Matchers Differ ... 55 (20)
Heat-setting in Seconds: Infrared Units on the Tenter ... 55 (20)
The Remazol Linkage ... 55 (20)
"No Shrink" Cellulose ... 56 (20)
Antistatic Finishing of Textiles ... 56 (20)
Dyeing and Finishing Terylene in Canada———A General Progress Report ... 56 (20)
Aspects of Pigment Dispersion Related to Usage (Mercer Lecture) ... 57 (20)
The Reaction of Wool with Sodium Hydroxide in Concentrated Salt Solutions ... 57 (20)
Procion Dye Staining for Differentiation of Skin and Core of Viscose Rayon Fibers ... 57 (20)
Thermal Comfort of Clothing of Varying Fiber Content ... 58 (20)
Fibers ... 58 (20)
Binders for Nonwoven Fabrics ... 58 (20)
The Effect of Commercial Laundering on Cotton Wash-wear Fabrics ... 59 (20)
The Mechanism of Pilling ... 59 (20)
High-strength Regenerated Cellulose Fibers ... 59 (20)
Dyeing Behavior of Feltmaking Fibers ... 60 (20)
The Dyeing, Printing and Finishing of Zefran Acrylic Alloy Fiber ... 60 (20)
Finishing Nonwoven Fabrics ... 60 (20)
New Man-made Fibers to Boom ... 77 (20)
New Sizing Materials for Synthetic Fiber Yarns ... 77 (20)
Use of Trichloroethylene in Continuous Scouring and Bleaching of Textiles ... 75 (21)
Chemical Reagents for Crease Resistance ... 75 (21)
The Scouring Process (for Cotton) ... 75 (21)
How to Choose a Pigment-printing System ... 76 (21)
The Finishing of Fabrics Containing Wool Blended with Terylene or Acrylic Fibers ... 63 (22)
Dyeing Unions Containing Acrylic Fibers ... 63 (22)
Reactive Dyes ... 63 (22)
Developments with Lifeguard Flame-retardant Solution ... 64 (24)
The Effects of Wash and Wear and Laundering on the Wrinkling of Fabrics ... 78 (23)
The Dyeing of Polyester Fibers and Blends ... 78 (23)
Impact of Wash-and-Wear on Cotton Agriculture ... 125 (25)
Important Advance in Synthetic Fiber Dyeing (Procinyl Dyes) ... 125 (25)
Identification of Dyestuffs (on the Fiber) ... 125 (25)
The Uses of Acrylic Fiber Blends with Reference to Colorfastness ... 125 (25)
Development of Yarn-dyeing Procedures for Nylon and Orlon Acrylic Fiber ... 126 (25)
Polyolefin Fibers and Polymer Structures ... 126 (25)
Phthalocyanine Dyes: Printing Difficulties ... 126 (25)
Creaseproofing Agents for Wash-and-Wear Finishing ... 129 (25)
Cotton Chemistry Makes Strides (New Water-repellent for Cotton) ... 129 (25)
Production of Fast Solid Shades on Cotton Piece Goods ... 129 (25)
The Dyeing of Acrilan and Its Blends ... 130 (25)
All About Textured Nylon Yarns ... 130 (25)
Some Observations on Dyeing by the Cuprous-ion Technique ... 130 (25)
Vinal: Processing and End Uses ... 133 (25)
Vinal: What It Is, What It Can Do ... 133 (25)
Zantrel ... 133 (25)
Dyeing Machines ... 133 (25)
Fast Dyeings on Wool Cellulosic Unions ... 134 (25)
Accelerant Dyeing of Hydrophobic Fibers—Principles and Mechanisms (Piedmont Section 23 (22), ... 37 (23)
Accelerotor, Abrasion Resistance of Fabrics: Evaluation of Wear by Means of the (AATCC Committee on Resistance to Abrasion ... 127 (19)
Acetate—A Basic Fiber for Nonwovens (Barach and Coates) ... 43 (11)
Acetate Blends and Arnel Triacetate Blends, Dyeing of (Salvin) ... 49 (7)
Acetylated Cotton Fabrics, The Improvement of Selected Physical Properties of Partially (Cooper Jr, Cruz, Murphy and Cashen) ... 43 (20)
Acrilan Acrylic Fiber, Recent Advances in the Dyeing of (Burnthall) ... 41 (10)
Acrilan-cotton Work-clothing Fabrics, The Continuous Wet Processing of (South Central Section) ... 35 (22)
Acrylic Fiber—Processing and Dyeing, Knit Goods of Orlon (Turner) ... 48 (14)
Acrylic Fiber, Recent Advances in the Dyeing of Acrilan (Burnthall) ... 41 (10)

ACTIVITIES OF LOCAL SECTIONS P28 (1), P62 (2), P97 (3), 59 (4), 56 (5), 58 (6), 74 (8), 58 (9) 58 (10), 52 (11), 54 (12), 45 (13) 54 (14), 46 (15), 58 (16), 61 (18), 51 (20), 63 (21), 55 (22), 33 (24), ... 39 (26)
Address, President's (Helmus) ... 46 (22)
Adventure in Research———The Development of a "Wash-and-Wear" Finish (Goldstein) ... 44 (5)
Agar Plate Method, Detection of Antibacterial Property of Fabrics (AATCC Committee on Antibacterial Agents) ... P8 (1)
Aids, Synthetic and Natural Fiber and Yarn Processing (Lighthipe and Schaubhut) ... 31 (13)
Alabama Polytechnic Institute (Adams) ... 98 (19)
Alkali Process, Durable Creases Produced in Cotton and Resin-finished Cotton Fabrics by an (Reeves and Mack) ... 43 (21)
Alphabetical List of New Products Developed Since November, 1958 ... 67 (25)
American Dyestuff Reporter Award, 9th ... 97 (19)
American Dyestuff Reporter Award Winner, Remarks by Charles R Williams, 1959 ... 48 (22)
Aminization Cost Study, Chemical Modification of Cotton (McMillan, Decossas, Drake Jr, Guthrie and Pollard) ... 37 (17)
Aminonaphthoquinones, The Chemistry of the (Merian) ... 31 (20)
Analysis of Consumer Complaints (Fynn) ... P11 (1)
Analysis of Finish in Textiles (AATCC Committee on Identification of Finishes on Textiles) ... 129(19)

Anderson, Gaede, Jones and Parks Elected VPs 17 (24)
Antibacterial Finishes for Cloth, Evaluation of the Effectiveness of (Majors) P91 (3)
Antibacterial Property of Fabrics; Aga: Plate Method, Detection of (AATCC Committee on Antibacterial Agents) P8 (1)
Appearance—Practical Evaluation of Wash and Wear Characteristics, Quantitative Measurement of Fabric (Williams) 37 (4)
Application and Control of Dieldrin for Durable Mothproofing, The Practical (Redston) 49 (6)
Application of Micro Fusion, Identification of Unknown Synthetic Fibers. Part III—Revision and (Smith) 23 (26)
Arnel Triacetate Blends, Dyeing of Acetate Blends and (Salvin) 49 (7)
Awards Luncheon, Valko, Chapin and Williams Honored at 48 (22)
Bleaches on Cotton, Evaluating the Effectiveness of Fluorescent Whiteners and Oxidizing (Furry, Bensing, Kirkley, Taube, Poole and Ross) 59 (8)
Bleaches Reach a Limit?, Why Does the Fluorescence of Optical (Allen) 27 (14)
Bleaching, Present-day Trends in (Easton) 24 (24)
Bleaching—The Thirteen Keys—Hints on Studying the History of Dyeing and (Edelstein) 35 (9)
Blended Yarns of 80% Zefran and 20% Cotton or Rayon, Package Dyeing (Burgess) 35 (10)
Blends, Dyeing of Acetate Blends and Arnel Triacetate (Salvin) 49 (7)
Blends of Dacron Polyester Fibers and Cellulose Fibers, Dyeing and Finishing (Iannarone Jr, Thomas and Holweger Jr) 41 (9)
Blends of Polyfibers with Cotton; Advantages—Dyeing and Finishing Techniques (Santymire) 45 (12)
Blends of Triazone and Urea Derivatives for Wrinkle-resistant Cotton Fabrics, Chlorine-resistant (Frick Jr, Arceneaux, Reinhardt and Reid) 29 (15)
Blends of Zefran and Cotton with Vat Dyes, Techniques for Union Dyeing (Burgess) 19 (24)

BOOK REVIEWS———
Notes for a Laboratory Course in Dyeing 55 (11)
Encyclopedia of Chemical Technology (First supplement volume) 55 (11)
Chemie der Azofarbstoffe Chemische Reine—Band 13 55 (11)
Inorganic Syntheses—Vol V 55 (11)
The Handbook of Chemical Data 56 (11)
The Handbook of Chemistry and Physics—39th Edition 56 (11)
The Technology of Cordage Fibers and Rope 56 (11)
Advances in Petroleum Chemistry and Refining—Volume 1 56 (11)
The Chemical Behavior of Zirconium 56 (11)
Lange's Handbook of Chemistry—9th Edition 67 (12)
Heterocyclic Compounds. Volume 5—Five-membered Heterocycles Containing Two Hetero Atoms and Their Benzo Derivatives 67 (12)
Heterocyclic Compounds. Volume 6—Six-membered Heterocycles Containing Two Hetero Atoms and Their Benzo Derivatives 67 (12)
Industrial Fatty Acids and Their Applications 51 (15)
Chromatographic Reviews—Volume 1 (1958). Progress in Chomatography, Electrophoresis, and Related Methods 51 (15)
Friction in Textiles 77 (23)
Handbook of Textile Fibers 77 (23)
Industrial Gums: Polysaccharides and Their Derivatives 134 (25)
Rheology of Disperse Systems 134 (25)

CALENDAR, AATCC P22 (1), P93 (3), 58 (4), 55 (5), 48 (6), 55 (7), 73 (8), 59 (9), 55 (10), 51 (11) 56 (12), 45 (13), 54 (14), 45 (15), 57 (16), 42 (17), 63 (18), 53 (20), 63 (21), 41 (22), 64 (23), 33 (24), 36 (24), 117 (25), 37 (26)

CALENDAR, GENERAL 41 (2), 36 (4), 61 (5), 39 (6), 67 (7), 88 (8), 40 (9), 74 (10), 36 (11) 82 (12), 25 (13), 29 (14), 58 (15), 68 (16), 35 (17), 142 (19), 77 (20), 50 (21), 54 (22), 72 (23), 145 (25)
California Textile Mill, Probability of a (Hall) 40 (13)
Candidates for National Office 53 (12)
Carbamoylethylation of Cotton Fabric; Preliminary Cost Study, The Continuous (Decossas, McMillan Jr, Reeves, Guthrie and Pollard) 30 (13)
Care Labelling Code for Textile Articles in Europe (Ringeissen) 29 (16)
Catalyst, A Mild-cure (Irvine, Simons and Davids) 37 (12)
CATCC-AATCC, Joint Technical Meeting 43 (16)
Celanese Wrinkle Tester, Evaluation of (Kaswell) 56 (7)
Cellulose Fibers, Dyeing and Finishing Blends of Dacron Polyester Fibers and (Iannarone Jr, Thomas and Holweger Jr)) 41 (9)
Cellulose, Reactions of Formals and Poly(formals) with (Kress) 33 (4)
Cellulosic Fabrics, Mechanisms Influencing the Wash and Wear Characteristics of (Williams) 27 (13)
Central Notations for Color-name Blocks 38 (10)
Challenge to the Chemical Industry, The Finisher's (Linberg) 44 (7)
Changes in Textile Fabrics, Research Developments——Committee on Dimensional (Artim) P21 (1)
Chapin and Williams Honored at Awards Luncheon, Valko 48 (22)
Chapin Award, Call for Nominations for the Harold C 56 (12), 36 (13)
Chapin Award Winner, Remarks by H C Chapin, 1959 Harold C 50 (22)
Chapin to Receive First Service Award 125 (19)
Chemical Industry, The Finishers' Challenge to the (Linberg) 44 (7)
Chemical Modification of Cotton: Aminization Cost Study (McMillan Jr, Decossas, Drake Jr, Guthrie and Pollard 37 (17)
Chemical Specialties, Important Notice to Manufacturers of Textile 61 (22), 38 (24)
Chemical Treatments of Cotton Tubular Knitgoods (Goldstein) 45 (8)
Chemicals for Nonwoven Fabrics (Taylor) 49 (5)
Chemicals for Textile Finishing—Field with a Future, Organic (Caldwell) 37 (7)
Chemicals—Markets and Technology, Textile 33 (7)
Chemistry of the Aminonaphthoquinones, The (Merian) 31 (20)
Chlorine, Damage Caused by Retained (AATCC Committee on Damage Caused by Retained Chlorine) P5 (1)
Chlorine, Research Developments——AATCC Committee on Damage Caused by Retained (Aurich) P14 (1), 51 (16)
Chlorine Resistance, Wrinkle-resistant Cotton with Durable (Frick Jr, Murphy Jr, Reinhardt, Arceneaux and Reid) 37 (18)
Chlorine Retention of Fabrics Treated with Dimethylol Ethyleneurea, Some Observations Regarding the (Smith) 49 (8)
Chromatographic Method for Identifying Mildew Inhibitors on Military Fabrics, Qualitative (Miles and Delasanta) 31 (7)
Chrome-dyed Wool Pieces, The Demetalization, Leveling and Rechroming of (Millson) 47 (18)
Clemson College (Gage) 99 (19)
Code for Textile Articles in Europe, Care Labelling (Ringeissen) 29 (16)
Colloidal Factors in Textile Pigment Printing Emulsions (Nelson) 1 (1)
Colorfastness to Light, Report on AATCC Committee on (Norton) 48 (16)
Colorfastness to Light, Research Developments——Committee on (Norton) P12 (1)
Colorfastness to Washing, Research Developments——AATCC Committee on (Lyon) 50 (16)
Colorfastness to Washing, Research Developments——Committee on (Smith) P18 (1)
Color-name Blocks, Central Notations for 38 (10)

COLOUR INDEX ADDITIONS AND AMENDMENTS———
Number 2 P56 (2)
Number 3 46 (9)
Number 4 32 (16)
Number 5 46 (23)
Complaints, Analysis of Consumer (Fynn) P11 (1)
Constitution, Proposal to Amend 56 (12)
Consumer Complaints, Analysis of (Fynn) P11 (1)
Consumer, The Importance of AATCC to the Textile Industry and the (Johnson) P23 (1)
Continuous Carbamoylethylation of Cotton Fabric: Preliminary Cost Study, The (Decossas, McMillan Jr, Reeves, Guthrie and Pollard) 30 (14)
Continuous Development of Direct Developed Dyeings (Kern) 36 (17)
Continuous Wet Processing of Cotton-Acrilan Work-clothing Fabrics, The (South Central Section) 35 (22)
Continuous Development of Direct Developed Dyeings
Contrast Effects, The Dyeing of Wool Pretreated to Produce (Postman) 43 (4)

CONVENTION, 1958 NATIONAL (Chicago)———
Nonionic Detergents in Raw-Wool Scouring Including Studies of Waste Clarification (Fong) P45 (2)
Recent Developments in Dyeing Orlon (Bidgood Jr and Bell) P51 (2)
Evaluation of the Effectiveness of Antibacterial Finishes for Cloth (Majors) P91 (3)
Expanding the Market for Nonwoven Fabrics (Shailer) 41 (4)
The Dyeing of Wool Pretreated to Produce Contrast Effects (Postman) 43 (4)
The Finishing and Dyeing of Fiber Glass Drapery Fabrics (Horton) 48 (4)
The Influence of Finishes on the Properties of Fiber Glass Tapes and Fabrics (Lotz) 50 (4)
Modern Finishes for Modern Fabrics (Glarum) 41 (5)
The Practical Application and Control of Dieldrin for Durable Mothproofing (Redston) 49 (6)
Dyeing of Acetate Blends and Arnel Triacetate Blends (Salvin) 49 (7)
Evaluation of the Celanese Wrinkle Tester (Kaswell) 56 (7)
Some Observations Regarding the Chlorine Retention of of Fabics Treated with Dimethylol Ethyleneurea (Smith) 49 (8)
Optical Wrinklemeter (Hunter and Lofland) 54 (8)
Evaluating the Effectiveness of Fluorescent Whiteners and Oxidizing Bleaches on Cotton. Part I—Unsoiled Swatches Washed in Launder-Ometer (Furry, Bensing and Kirkley) 59 (8)
Part II—Naturally Soiled Pillowcases Washed and Dried in Household Equipment (Furry, Bensing, Taube, Poole and Ross 67 (8)
Recent Advances in the Dyeing of Acrilan Acrylic Fiber (Burnthall) 41 (8)
The Demetalization, Leveling and Rechroming of Chrome-dyed Wool Pieces (Millson) 47 (18)

CONVENTION, 1959 NATIONAL (Washington)———
Plans Underway P25 (1)
A "Welcome to Washington" from the Chairmen P90 (3)
Convention Notes 58 (4)
Views of the Headquarters Hotel 61 (9)
Meeting of the Executive Committee 57 (10)
Treasurer's Request 50 (11)
Top-flight Recreation Program to be Featured 55 (12), 125 (19)
Sights to be Seen in the Convention City 42 (13)
A Message from the Exhibit Chairman 83 (14)
Ladies Program 44 (15), 84 (19)
Technical Program 57 (16), 85 (19)
Messages from the Tours Committee and Dining Committee Chairmen 41 (17)
Messages from the Registration Committee, Printing Committee and Transportation Committee Chairmen 41 (17)
Thirty Firms to Exhibit 60 (18)
A Message from the Reception Committee Chairman 60 (18)
Publicity Committee 60 (18)
President's Invitation (Helmus) 81 (19)
Greetings from the Vice Presidents (Parks, Anderson, Smith and Morrill) 82 (19)
Greetings from the Southern Region's Sectional Chairmen (Helms, Hallowell, King, and Sookne) 83 (19)
Greetings from the Convention Chairmen 84 (19)
General Program 85 (19)
Photos of Founder and Honorary Members of AATCC 87 (19)
Photos of Past Presidents 88 (19)
Photos of Treasurer and Senior Staff 89 (19)
Photos of Chairmen of Standing Committees of the Council 90 (19)
Executive Committee (Convention) 91 (19)
Personnel Service 92 (19)
Your Hosts———The Sections of the Southern Region:—
Piedmont Section (Thompson) 93 (19)
South Central Section 95 (19)

Southeastern Section (Haynes) 96 (19)
Washington Section (Graham) 97 (19)
9th American Dyestuff Reporter Award 97 (19)
A History of Textile Education in the Southern Region:—
Alabama Polytechnic Institute (Adams) 98 (19)
Clemson College (Gage) 99 (19)
Georgia Institute of Technology (Taylor) 100 (19)
North Carolina State College (Rutherford) 101 (19)
Dyeing and Finishing Exhibit Descriptions 105 (19)
Emery I Valko—16th Olney Medalist 109 (19)
Abstracts of Technical Papers 114 (19)
Intersectional Contest (Judges, Committees, Abstracts of Papers) 119 (19)
Visits to Local Laboratories 125 (19)
Chapin to Receive First Service Award 125 (19)
1959 Intersectional Contest:—
Dyeing with Direct Dyes———The Effect of Various Salts (Southeastern Section) 51 (21)
"Wash-and-Wear" Ratings: Subjective and Objective (Washington Section) 57 (21)
Accelerant Dyeing of Hydrophobic Fibers———Principles and Mechanisms (Piedmont Section) 23 (22),
The Continuous Wet Processing of Cotton-Acrilan Work-Clothing Fabrics (South Central Section) 35 (22)
Pile Fabrics (Northern New England Section) 103 (25)
A Study of the Removal of Metal Ions from Cotton Fabrics (Rhode Island Section) 27 (26)
Northern New England Section Wins 20th Intersectional Contest 63 (21)
Washington Convention Attracts 1680 Registrants 42 (22)
President's Address (Helmus) 46 (22)
Valko, Chapin and Williams Honored at Awards Luncheon 48 (22)
44 Participate in Golf Tournament 51 (22)
Techniques for Union Dyeing Blends of Zefran and Cotton with Vat Dyes (Burgess) 19 (24)
Present-day Trends in Bleaching (Easton) 24 (24)
Progress in "Wash-and-Wear" Wools (Krasny and Menkart) 114 (25)

CORRECTION NOTICES P26 (1), 47 (2), 59 (4), 73 (5), 65 (7), 77 (8), 55 (14), 35 (17), 53 (20), 45 (23), 40 (26)
Cost Study, Chemical Modification of Cotton: Aminization (McMillan, Decossas, Drake Jr, Guthrie and Pollard) .. 37 (17)
Cost Study, The Continuous Carbamoylethylation of Cotton Fabric: Preliminary (Decossas, McMillan Jr, Reeves, Guthrie and Pollard 30 (14)
Cotton-Acrilan Work-clothing Fabrics, The Continuous Wet Processing of (South Central Section) 35 (22)
Cotton Advantages———Dyeing and Finishing Techniques, Blends of Polyfibers with (Santymire) 45 (12)
Cotton: Aminization Cost Study, Chemical Modification of (McMillan Jr, Decossas, Drake Jr, Guthrie and Pollard) 37 (17)
Cotton, An Investigation of Inorganic Salts and Oxides as Finishes for Cotton (Esteve Jr, Wright and Mack) 139 (19)
Cotton and Viscose Packages, Vat Dyeing of (Bardt) 43 (6)
Cotton, Detection and Geographical Origin of Iron-spotted Raw (Harrison and Marsh) 47 (21)
Cotton, Evaluating the Effectiveness of Fluorescent Whiteners and Oxidizing Bleaches on (Furry, Bensing, Kirkley, Taube, Poole and Ross) 59 (8)
Cotton Fabric: Preliminary Cost Study, The Continuous Carbamoylethylation of (Decossas, McMillan Jr, Reeves, Guthrie and Pollard) 30 (14)
Cotton Fabrics, A Study of the Removal of Metal Ions from (Rhode Island Section) 27 (26)
Cotton Fabrics by an Alkali Process, Durable Creases Produced in Cotton and Resin-treated (Reeves and Mack) 43 (21)
Cotton Fabrics, Chlorine-resistant Blends of Triazone and Urea Derivatives for Wrinkle-resistant (Frick Jr, Arceneaux, Reinhardt and Reid) 29 (15)
Cotton Fabrics, Tetrahydropyrimidinone Derivatives for Nonchlorine-retentive, Wrinkle-resistant (Frick Jr, Kottes and Reid) 23 (13)
Cotton Fabrics, The Improvement of Selected Physical Properties of Partially Acetylated (Cooper Jr, Cruz, Murphy and Cashen) 43 (20)
Cotton Fabrics with Triazone Derivatives, Imparting Wrinkle Resistance to (Reid, Frick Jr, Reinhardt and Arcenteaux) 81 (3)
Cotton or Rayon, Package Dyeing Blended Yarns of 80% Zefran and 20% (Burgess) 35 (10)
Cotton Tubular Knitgoods, Chemical Treatments of (Goldstein) 45 (8)
Cotton with Durable Chlorine Resistance, Wrinkle-resistant (Frick Jr, Murphy Jr, Reinhardt, Arceneaux and Reid) 37 (18)
Cotton with Vat Dyes, Techniques for Union Dyeing Blends of Zefran and (Burgess) 19 (24)

COUNCIL REPORTS———
213th Meeting 53 (4)
214th Meeting 56 (9)
215th Meeting 39 (17)
216th Meeting 53 (22)
Council to Meet in Montreal May 29 ..... 60 (9)
Creases Produced in Cotton and Resin-treated Cotton Fabrics by an Alkali Process, Durable (Reeves and Mack) 43 (21)
Crockmeter for Yarn Testing, An Improved (Korpanty and Trommer) 40 (6)
Dacron, Improving the Hand of Fabrics of (LaGasse and Taylor Jr) 77 (3)
Dacron Polyester Fibers and Cellulose Fibers, Dyeing and Finishing Blends of (Iannarone Jr, Thomas and Holweger Jr) 41 (9)
Damage Caused by Retained Chlorine (AATCC Committee on Damage Caused by Retained Chlorine) P5 (1)
Damage Caused by Retained Chlorine, Research Developments———AATCC Committee on (Aurich) P14 (1), 51 (16)
DECEASED, AATCC 55 (14), 63 (18), 54 (22), 37 (26)
Decorative Fabrics from Fibrous Glass (Lachut) 43 (12)

DELAWARE VALLEY SECTION———
Activities P62 (2), 57 (5), 74 (8), 46 (13), 51 (20), 55 (22), . . .(26)
Demetalization, Leveling and Rechroming of Chrome-dyed Wool Pieces (Millson) 47 (18)
Desizing Agents Reorganized, AATCC Committee on Evaluation of P29 (1)
Detection and Geographical Origin of Iron-spotted Raw Cotton (Harrison and Marsh) 47 (21)
Detection of Antibacterial Property of Fabrics; Agar Plate Method (AATCC Committee on Antibacterial Agents) .. P8 (1)
Detergents in Raw Wool Scouring Including Studies of of Waste Clarification, Nonionic (Fong) P45 (2)
Developed Dyeings, Continuous Development of Direct, (Kern) 36 (17)
Development of Silicone Finishes in the Textile Industry (Rossiter) 47 (7)
Developments in Dyeing Orlon, Recent (Bidgood Jr and Bell) P51 (2)
Dieldrin for Durable Mothproofing, The Practical Application and Control of (Redston) 49 (6)
Dimensional Changes in Textile Fabrics, Research Developments———AATCC Committee on (Artim) P21 (1)
Dimensional Changes in Textile Fabrics, Research Developments———AATCC Committee on (Warner) 55 (16)
Dimensional Restorability of Woven Textiles after Laundering (AATCC Committee on Dimensional Changes in Textile Fabrics) 133 (19)
Dimethylol Ethyleneurea, Some Observations Regarding the Chlorine Retention of Fabrics Treated with (Smith) .. 49 (8)
Direct, Developed Dyeings, Continuous Development of (Kern) 36 (17)
Direct Dyes———The Effect of Various Salts, Dyeing with (Southeastern Section) 51 (21)
Disperse Dyes, Relation of Dye Structure to Properties of (Salvin, Walker and Adams) 35 (14)
Drapery Fabrics, The Finishing and Dyeing of Fiber Glass (Horton) 48 (4)
Drycleaning Test Methods, Research Developments——— Committee on (Johnson) P17 (1)
Drying Yarn Packages? Why Use Static Pressure (Craig) .. 50 (20)
Durable Creases Produced in Cotton and Resin-finished Cotton Fabrics by an Alkali Process (Reeves and Mack) 43 (21)
"Dye Balls" and "Family Colors"———The Story of Packaged Dyes for the Home (Edelstein) 32 (15)
Dye Structure to Properties of Disperse Dyes, Relation of (Salvin, Walker and Adams) 35 (14)
Dyeing and Bleaching—The Thirteen Keys—Hints on Studying the History of (Edelstein) 35 (9)
Dyeing and Finishing Blends of Dacron Polyester Fibers and Cellulose Fibers (Iannarone Jr, Thomas and Holweger Jr) 41 (9)
Dyeing and Finishing, Instrumentation—An Integral Part of (Ridley) 37 (15)
Dyeing and Finishing of Kodel Fiber and Fabrics (Ivey Jr) P94 (3)
Dyeing and Finishing Techniques, Blends of Polyfibers with Cotton Advantages (Santymire) 45 (12)
Dyeing Blended Yarns of 80% Zefran and 20% Cotton or Rayon, Package (Burgess) 35 (10)
Dyeing Blends of Zefran and Cotton with Vat Dyes, Techniques for Union (Burgess) 19 (24)
Dyeing, Knit Goods of Orlon Acrylic Fiber—Processing and (Turner) 48 (14)
Dyeing Machine, Practical Experience with the Pad-Roll (Percarpio, Lesh and Thackrah) 41 (15)
Dyeing of Acetate Blends and Arnel Triacetate Blends (Salvin) 49 (7)
Dyeing of Acrilan Acrylic Fiber, Recent Advances in (Burnthall) 41 (10)
Dyeing of Cotton and Viscose Packages, Vat (Bardt) 43 (6)
Dyeing of Fiber Glass Drapery Fabrics, The Finishing and (Horton) 48 (4)
Dyeing of Hydrophobic Fibers—Principles and Mechanisms, Accelerant (Piedmont Section) 23 (22), 37 (23)
Dyeing of Wool at Subboiling Temperatures (Schmitt) .. 40 (18)
Dyeing of Wool Pretreated to Produce Contrast Effects, The (Postman) 43 (4)
Dyeing Orlon, Recent Developments in (Bidgood Jr and Bell) P51 (2)
Dyeing with Direct Dyes—The Effect of Various Salts (Southeastern Section) 51 (21)
Dyeings, Continuous Development of Direct, Developed (Kern) 36 (17)
Dyes and Pigments, Important Notice to All Maufacturers of P55 (2)
Dyes, Techniques for Union Blends of Zefran and Cotton with Vat (Burgess) 19 (24)
Dyestuffs, Reactive (Caswell) 39 (10)
Dyestuffs, The Effect of Thickening Agents in Padding with Ultrasperse Vat (Kern) 57 (12)
Education in the Southern Region, A History of Textile (Adams, Gage, Taylor and Rutherford) 98 (19)

EMPLOYMENT REGISTER 59 (4), 58 (5), 59 (6), 77 (8), 55 (12), 41 (13), 63 (18), 135 (19)
Emulsions, Colloidal Factors in Textile Pigment Printing (Nelson) 1 (1)
Emulsions in Textile Applications, Use of Polyethylene (Rosenbaum) 46 (10)
Europe, Care Labelling Code for Textile Articles in (Ringeissen) 29 (16)
Europe's Model Textile Finisher (Meyer) 31 (11)
Evaluation of Desizing Agents Reorganized, AATCC Committee on P29 (1)
Evaluation of the Celanese Wrinkle Tester (Kaswell) 56 (7)
Evaluation of the Effectivness of Antibacterial Finishes for Cloth (Majors) 91 (3)
Evaluation of Wash and Wear Characteristics———Quantitative Measurement of Fabric Appearance—Practical (Williams) 37 (4)
Fators to Consider When Selecting Water-soluble Gums, Important (Ferri) 32 (14)
"Family Colors"—The Story of Packaged Dyes for the Home, "Dye Balls" and (Edelstein) 32 (15)
Finish, An Advenutre in Research—The Development of a "Wash-Wear" (Goldstein) 44 (5)
Finish in Textiles, Analysis of (AATCC Committee on Identification of Finishes on Textiles) 129 (19)
Finishes for Cloth, Evaluation of the Effectiveness of Antibacterial (Majors) P91 (3)
Finishes for Cotton, An Investigation of Inorganic Salts and Oxides as (Esteve Jr, Wright and Mack) 139 (19)
Finishes for Modern Fabrics, Modern (Glarum) 41 (5)
Finishes in the Textile Industry, Development of Silicone (Rossiter) 47 (7)
Finishes on the Properties of Fiber Glass Tapes and Fabrics, The Influence of (Lotz) 50 (4)

Finisher, Europe's Model Textile (Meyer) 31 (11)
Finisher's Challenge to the Chemical Industry, The Textile (Linberg) 44 (7)
Finishing and Dyeing of Fiber Glass Drapery Fabrics, The (Horton) 48 (4)
Finishing Blends of Dacron Polyester Fibers and Cellulose Fibers, Dyeing and (Iannarone Jr, Thomas and Holweger Jr) 41 (9)
Finishing—Field with a Future, Organic Chemicals for Textile (Caldwell) 37 (7)
Finishing, Instrumentation—An Integral Part of Dyeing and (Ridley) 37 (15)
Finishing of Kodel Fiber and Fabrics, Dyeing and (Ivey Jr) 94 (3)
Finishing Techniques, Blends of Polyfibers with Cotton Advantages—Dyeing and (Santymire) 45 (12)
Flameproof Fabrics, Some Properties of (Sandholzer) 37 (2)
Fluorescence of Optical Bleaches Reach a Limit?, Why Does the (Allen) 27 (14)
Fluorescent Whiteners and Oxidizing Bleaches on Cotton, Evaluating the Effectiveness of (Furry, Bensing, Kirkley, Taube, Poole and Ross) 59 (8)
Fluorochemicals: The New Idea in Textiles (Grajeck and Petersen) 37 (13)
Formals and Poly(formals) with Cellulose, Reactions of (Kress) 33 (4)

FUTURE PAPERS to Appear in the Proceedings P7 (1), P50 (2), 57 (6), 77 (8), 59 (9), 50 (10), 52 (11), 36 (13), 55 (14), 63 (18), 135 (19), 38 (26)
Gaede, Jones, Parks and Anderson Elected VPs 17 (24)
Georgia Institute of Technology (Taylor) 100 (19)
Glass, Decorative Fabrics from Fibrous (Lachut) 43 (12)
Glass Drapery Fabrics, The Finishing and Dyeing of Fiber (Horton) 48 (4)
Glass Tapes and Fabrics, The Influence of Finishes on the Properties of Fiber (Lotz) 50 (4)
Golf Tournament at Convention, 44 Participate in 51 (22)
Gums, Important Factors to Consider When Selecting Water-soluble (Ferri) 32 (14)
Hand of Fabrics of Dacron, Improving the (LaGasse and Taylor Jr) 77 (3)
Harold C Chapin Award, Call for Nominations for the 56 (12), 36 (13)
Harold C Chapin Award Winner, Remarks by H C Chapin, 1959 50 (22)
Helmus Elected for Second Term 17 (24)
Highlights of the Past Year (Wood) 99 (25)
History of Dyeing and Bleaching——The Thirteen Keys ——Hints on Studying the (Edelstein) 35 (9)
History of Nonwoven Development at 3M (Frank) 51 (14)
Hosts—The Sections of the Southern Region, Your (Thompson, Haynes and Graham) 93 (19)

HUDSON-MOHAWK SECTION——
Activities 59 (4), 58 (5), 74 (8), 45 (13), 63 (18), 57 (22)
Hydrophobic Fibers—Principles and Mechanisms, Accelerant Dyeing of (Piedmont Section) 23 (22), 37 (23)
Idea in Textiles, Fluorochemicals: The New (Grajeck and Petersen) 37 (13)
Identification of Unknown Synthetic Fibers. Part II— Application of Polarized Light Microscopy (Smith) 35 (6)
Part III—Revision and Application of Micro Fusion 23 (26)
Imparting Wrinkle Resistance to Cotton Fabrics with Triazone Derivatives (Reid, Frick Jr, Reinhardt and Arceneaux) 81 (3)
Importance of AATCC to the Textile Industry and the Consumer, The (Johnson) P23 (1)
Improvement of Selected Physical Properties of Partially Acetylated Cotton Fabrics, The (Cooper Jr, Cruz, Murphy and Cashen) 43 (20)
Improving the Hand of Fabrics of Dacron (LaGasse and Taylor Jr) 77 (3)
Index to Patent Digest 32 (1)
Individual Membership Drive Underway 55 (22)
Influence of Finishes on the Properties of Fiber Glass Tapes and Fabrics, The (Lotz) 50 (4)
Inhibitors on Military Fabrics, Qualitative Chromatogaphic Method for Identifying Mildew (Miles and Delasanta) 31 (7)
Inorganic Salts and Oxides as Finishes for Cotton, An Investigation of (Esteve Jr, Wright and Mack) 139 (19)
Inorganics—Their Place and Expected Growth Pattern (Currier) 33 (7)
Instrumentation—An Integral Part of Dyeing and Finishing (Ridley) 37 (15)

INTER ALIA—INTER NOS (Wood)——
January Ictus 65 (2)
February Fantasia 61 (4)
March March 61 (6)
April Adagio 79 (8)
May Motet 61 (10)
June Jazz 48 (13)
July Jubilee 47 (15)
August Arpeggio 45 (17)
September Sonata 145 (19)
October Octet 65 (21)
November Neigh 43 (24)
December Descant 41 (26)
Interlaboratory Statistical Plan, A Report on AATCC's (Johnson) 54 (16)
Intersectional Contest, Northern New England Section Wins 20th 63 (21)
Intersectional Contest Rules 56 (10), 51 (12)
Introducing a New Starch Size (Casey) 47 (7)
Ions from Cotton Fabrics, A study of the Removal of Metal (Rhode Island Section) 27 (26)
Joint Technical Meeting, AATCC-CATCC 43 (16)
Jones, Parks, Gaede and Anderson Elected VPs 17 (24)
Keys—Hints on Studying the History of Dyeing and
Knit Goods of Orlon Acrylic Fiber—Processing and Dyeing (Turner) 48 (14)
Knitgoods, Chemical Treatments of Cotton Tubular (Goldstein) 45 (8)
Knitting Arts Exhibition, 44th 41 (8)
Kodel Fiber and Fabrics, Dyeing and Finishing of (Ivey Jr) 94 (3)
Labelling Code for Textile Articles in Europe, Care (Ringeissen) 29 (16)
Laundering, Dimensional Restorability of Woven Textiles after (AATCC Committee on Dimensional Changes in Textile Fabrics) 133 (19)
Leveling and Rechroming of Chrome-dyed Wool Pieces, The Demetalization, (Millson) 47 (18)
Light, Report on AATCC Committee on Colorfastness to (Norton) 48 (16)
Light, Research Developments——Committee on Colorfastness to (Norton) P12 (1)
Limit?, Why Does the Fluorescence of Optical Bleaches Reach a (Allen) 27 (14)
List of New Products Developed Since November, 1958, Alphabetical 67 (25)
3M, History of Nonwoven Development at (Frank) 51 (14)
Machine, Practical Experience with the Pad-Roll Dyeing (Percarpio, Lesh and Thackrah) 41 (15)
Machinery Exhibit, Milan International Textile (Platnick) 121 (25)
Management and Piedmont Research, Mill (Browder) 18 (24)
Manufacturers of Textile Chemical Specialties, Important Notice to 61 (22), 38 (24)
Market for Nonwoven Fabrics, Expanding the (Shailer Jr) 41 (4)
Markets and Technology, Textile Chemicals—— 33 (7)
Measurement of Fabric Appearance——Practical Evaluation of Wash and Wear Characteristics, Quantitative (Williams) 37 (4)
Mechanisms Influencing the Wash and Wear Characteristics of Cellulosic Fabrics (Williams) 27 (13)

MEMBERSHIP APPLICATIONS P26 (1), P54 (2), 57 (4), 54 (5), 59 (6), 76 (8), 60 (9), 58 (10), 50 (11), 53 (12), 44 (13), 55 (14), 45 (15), 59 (16), 42 (17), 53 (20), 64 (21), 63 (23), 30 (24), 118 (25)
Membership Drive Underway, Individual 55 (22)

MEMBERSHIP, ELECTED TO P27 (1), P50 (2), 54 (5), 76 (8), 59 (9), 57 (10), 50 (11), 54 (12), 44 (13), 55 (14), 45 (15), 42 (17), 64 (21), 41 (22), 32 (24), 38 (26)
Message from the New President, A (Helmus) P25 (1)
Metal Ions from Cotton Fabrics, A Study of the Removal of (Rhode Island Section) 27 (26)

METROPOLITAN SECTION——
Activities 59 (4), 58 (6), 58 (9), 52 (11), 59 (16), 63 (18), 51 (20), 52 (20), 63 (21), 57 (22), 39 (26)
Micro Fusion, Identification of Unknown Synthetic Fibers. Part III—Revision and Application of (Smith) 27 (26)
Microscopy, Identification of Unknown Synthetic Fibers. Part II—Applications of Polarized Light (Smith) 35 (6)
Part III—Revision and Application of Micro Fusion 23 (26)

MID-WEST SECTION——
Activities 57 (5), 74 (8), 52 (11), 46 (15), 33 (24), 40 (26)
Milan International Textile Exhibit (Platnick) 121 (25)
Mild-cure Catalyst, A (Irvine, Simons and Davids) 37 (12)
Mildew Inhibitors on Military Fabrics, Qualitative Chromatographic Method for Identifying (Miles and Delasanta) 31 (7)
Military Fabrics, Qualitative Chromatographic Method for Identifying Mildew Inhibitors on (Miles and Delasanta) 31 (7)
Mill Management and Piedmont Research (Browder) 18 (24)
Mill, Probability of a California Textile (Hall) 40 (13)
Montreal May 29, Council to Meet in 60 (9)
Mothproofing, The Practical Application and Control of Dieldrin for Durable (Redston) 49 (6)

NAMES IN THE NEWS 75 (2), 104 (3), 74 (4), 70 (5), 70 (7), 91 (8), 68 (9), 77 (10), 62 (11), 68 (12), 54 (13), 73 (14), 63 (15), 73 (16), 61 (17), 71 (18), 168 (19), 74 (20), 72 (21), 70 (22), 74 (23), 146 (25), 56 (26)
NEW PRODUCTS, DEVELOPMENTS, PROCESSES 72 (2), 100 (3), 73 (4), 62 (5), 63 (6), 68 (7), 67 (9), 76 (10), 77 (12), 55 (13), 66 (14), 59 (15), 70 (16), 57 (17), 70 (18), 166 (19), 66 (20), 76 (23), 138 (25)
NEWS OF THE TRADE 33 (1), 67 (2), 100 (3), 69 (4), 59 (5), 63 (6), 63 (7), 87 (8), 65 (9), 71 (10), 59 (11), 79 (12), 51 (13), 65 (14), 57 (15), 67 (16), 55 (17), 67 (18), 159 (19), 63 (20), 69 (21), 67 (22), 67 (23), 47 (24), 137 (25), 52 (26)

NIAGARA FRONTIER SECTION——
Activities P28 (1), 58 (6), 75 (8), 51 (20)
Nonionic Detergents in Raw-Wool Scouring Including Studies of Waste Clarification (Fong) 45 (2)
Nonwoven Development at 3M, History of (Frank) 51 (14)
Nonwoven Fabrics, Chemicals for (Taylor) 49 (5)
Nonwoven Fabrics, Expanding the Market for (Shailer Jr) 41 (4)
Nonwovens, Acetate—A Basic Fiber for (Barach and Coates) 43 (11)
North Carolina State College (Rutherford) 101 (19)

NORTHERN NEW ENGLAND SECTION——
Activities P28 (1), 58 (5), 74 (8), 54 (14), 45 (15), 61 (18), 63 (18), 57 (22), 33 (24), 40 (26)
Northern New England Section Wins 20th Intersectional Contest 63 (21)
Notice to All Manufacturers of Dyes and Pigments, Important (AATCC) 55 (2)
Notice to Manufacturers of Textile Chemical Specialties, Important 61 (22), 38 (24)
Olney Medal Award Candidates, Invitation to Nominate P97 (3), 58 (5), 59 (6)
Olney Medalist, Emery I Valko, 16th 109 (19)
Olney Medalist, Remarks by Emery I Valko, 1959 49 (22)
Olney Medalist, Valko Named 1959 53 (12)
Optical Bleaches Reach a Limit?, Why Does the Fluorescence of (Allen) 27 (14)
Optical Wrinklemeter (Hunter and Lofland) 54 (8)
Organic Chemicals for Textile Finishing——Field with a Future (Caldwell) 37 (7)
ORGANIZATION OF AATCC 60 (4), 60 (6), 60 (10), 44 (17), 86 (19), 54 (20), 60 (22), 40 (24)

Origin of Iron-spotted Raw Cotton, Detection and Geographical (Harrison and Marsh) 47 (21)
Orlon Acrylic Fiber—Processing and Dyeing, Knit Goods of (Turner) 48 (14)
Orlon, Recent Developments in Dyeing (Bidgood Jr and Bell) P51 (2)
Oxides as Finishes for Cotton, An Investigation of Inorganic Salts and (Esteve Jr, Wright and Mack) 139 (19)
Oxidizing Bleaches on Cotton, Evaluating the Effectiveness of Fluorescent Whiteners and (Furry, Bensing, Kirkley, Taube, Poole, and Ross) 59 (8)
PACIFIC NORTHWEST SECTION——— Activities P29 (1)
PACIFIC SOUTHWEST SECTION——— Activities 58 (9), 35 (24)
Package Dyeing Blended Yarns of 80% Zefran and 20% Cotton or Rayon (Burgess) 35 (10)
Packaged Dyes for the Home, "Dye Balls" and "Family Colors"—The Story of (Edelstein) 32 (15)
Packages, Vat Dyeing of Cotton and Viscose (Bardt) 43 (6)
Packages? Why Use Static Pressure in Drying Yarn (Craig) 50 (20)
Padding with Ultrasperse Vat Dyestuffs, The Effect of Thickening Agents in (Kern) 57 (12)
Pad-Roll Dyeing Machine, Practical Experience with the (Percarpio, Lesh and Thackrah) 41 (15)
Parks, Anderson, Gaede and Jones Elected Vps 17 (24)
Partially Acetylated Cotton Fabrics, The Improvement of (Cooper Jr, Cruz, Murphy and Cashen) 43 (20)

PATENT DIGEST (Wengraf)———
Antistatic Treatment—Cross-linkable, oxygen-containing polyamides plus noncrosslinking polyethers 31 (1)
Durable Mechanical Finishing Effects on Rayon—Highly alkylated methylolureas applied 31 (1)
Stable Mechanical Finishing Effects—Impregnating with special aminoplast mixtures 44 (2)
Shrinkproofing of Wool—Combination of epoxy resins and polyalkyleneimines 44 (2)
Varitone Cloth Dyeing Method—Color applied to compressed fabric in rope form 63 (10)
Development of Special Ice-color Prints in neutral steam 63 (10)
Extender Pastes in O-I-W Emulsion Printing 64 (10)
Pigment Printing with O-I-W Emulsions—Crocking fastness improved 64 (10)
Flameproofing with addition products of alkalifluorides and boric anhydride 65 (10)
Antistatic Agents—Anionic guanamine phosphonates 65 (12)
Antistatic Agents—Polymerized acrylic esters of quaternized ammonium glycol ether derivatives 65 (12)
Hydrophobing with Organohalogen Silanes present in gaseous mixtures 66 (12)
Crease- and Shrinkproofing—Esters of P-containing acids and epoxyalcohols 66 (12)
Restoring Whiteness to Yellowed Nylon—Hypochlorite treatment 57 (14)
Creaseroofing of Cotton or Rayon—Dialdehydes plus catalyst applied and cured 57 (14)
Preventing Yellowing of Nylon—Treatment with urea and other N-organic compounds 57 (14)
Continuous Vat-dyeing Process—Increased alkali content of dyebath 58 (14)
Shrinkproofing of Wool—Insolubilized copolymers of 4-vinylpyridine applied 58 (14)
Flameproofing of Textiles—Combination of amidophosphates and methylolmelamines 58 (14)
Flameproofing of Cellulosic Fibers—Condensates of amidophosphoric esters and trimethylolmelamines with alkylphosphate adducts 61 (14)
Pigment Prints—Fixation with condensates of polyepoxy compounds 61 (14)
Antistatic Treatment—Unsaturated esters polymerized in the presence of boron compounds 61 (14)
Textile Printing Method using extremely shallow photogravure engravings 62 (14)
Dyeing of Polyacrylonitrile Fibers with unsulfonated azo-dyes containing a cycloammonium group 62 (14)
Application of Antistatic Agents—Sulfonating the surface of polyethylene articles 36 (15)
Dyeing of Polyester Fibers—Dimethylterephthalate plus benzanilide as carriers 52 (15)
Improved Fastness of Water-soluble Dyes—Dicyandiamine condensates applied 52 (15)
Reducing the Formaldehyde Liberation in Resin-finished Fabrics—Aftertreatment with acceptor 52 (15)
Water-repellent Finish—O-I-W emulsions containing alkyl-etherified methylolmelamines 53 (15)
Dyeing Wool with Neutral-dyeing Metalized Azo Dyes—Treatment with polyoxyethylene glycol 53 (15)
Shrinkproof and Antistatic Treatment—Melamine condensates plus magnesium chloride as curing agent 54 (15)
Antistatic Treatment with quaternary phosphonium salts 54 (15)
Fireproofing of Textiles—Chlorine-modified vinyl resins plus antimony phosphate 54 (15)
Printing Copperable Direct Dyes—Cuprous thiocyanate as complex-forming agent added 63 (16)
Bleaching with Chlorite—Evolution of chlorine dioxide controlled by organic acid esters 63 (16)
Dyeing Polyester or Cellulosic Acetate Fibers—Sulfonic acid groups of anthraquinone dyes removed by reduction 63 (16)
Shrinkproofing of Wool or Wool-containing Fabrics—Polyether-polyepoxides applied 64 (16)
Bleaching of Cyanoethylated Cotton with hydrogen peroxide-phosphate solution 64 (16)
Shrink-resistant Cellulosic Textiles—Combination of N-N-disubstituted melamines with other bases, condensed with formaldehyde 49 (17)
Coloring Textiles with Pigments fixed with acid colloid melamine resins plus nonionics 49 (17)
Shrink-resistant Cellulosic Textiles—Combination of N-N-disubstituted melamines with other bases, condensed with formaldehyde 49 (17)
Coloring Textiles with Pigments fixed with acid colloid melamine resins plus nonionics 49 (17)
Antistatic Treatment—Quaternary ammonium compounds substituted by fatty acid amidoalkenes and alkeneoxy groups 49 (17)
Hydrophobing of Textiles—Aluminum salts of lower and higher aliphatic acids applied 50 (17)
Hydrophobing of Textiles with amidomethyl quaternary ammonium siloxanes 50 (17)
Wet-crease-resistant Textiles—Polysiloxane oils combined with formaldehyde precondensates 51 (17)
Flameproofing with polymerized alkenyl cyanomethane phosphonates 51 (17)
Hydrophobing with Silicones—Stannous salts as curing agents 51 (17)
Peroxide Bleaching of Cotton—Pretreatment with a wetting agent plus molecularly dehydrated phosphates 52 (17)
Bleaching with Alkaline Peroxide—Formamidine sulfinate pretreatment 52 (17)
Dyeing Wool with Anthraquinone Vat Dyes—Strictly controlled temperature and pH 44 (17)
Abrasion Resistance of Resin-finished Fabrics Improved—Superheated steam introduced in curing 44 (17)
Flameproofing of Textiles with polymers of ethylene imine-phosphorus derivatives and amines 44 (17)
Organosiloxane Emulsions readily absorbed by substrates 45 (17)
Pigment Printing Paste—Reaction products of epichlorohydrin with ammonia or amines as fixing agents 45 (17)
Stabilizing of Wool—Crosslinking of thiol groups by cyclic unsaturated compounds 45 (17)
Water-repellent Composition—Carbamide-formaldehyde condensate, higher amides, taurinating agents 45 (17)
Patent Digest (1958), Index to 32 (1)
Percales, Performance of Selected Resin-treated (Golden, Stevens and Richey) 29 (17)
Performance of Selected Resin-treated Percales (Golden, Stevens and Richey) 29 (17)
Phthalocyanine, A Breakthrough in Pigment Technology, The New Yellow-Green (Wich) 42 (18)
Physical Properties of Partially Acetylated Cotton Fabrics, The Improvement of Selected (Cooper, Cruz, Murphy and Cashen) 43 (20)
Piedmont Research, Mill Management and (Browder) 18 (24)

PIEDMONT SECTION———
Activities 59 (4), 56 (5), 58 (6), 58 (10), 46 (15), 61 (18)
Piedmont Section History (Thompson) 93 (19)
Pigment Printing Emulsions, Colloidal Factors in Textile (Nelson) 1 (1)
Pigment Technology, The New Yellow-Green Phthalocyanine, A Breakthrough in (Wich) 42 (18)
Pigments, Important Notice to All Manufacturers of Dyes and P55 (2)
Pile Fabrics (Northern New England Section) 103 (25)
Plan, A Report on AATCC's Interlaboratory Statistical (Johnson) 54 (16)
Polarized Light Microscopy, Identification of Unknown Synthetic Fibers. Part II———Applications of (Smith) 35 (6)
Polyester Fibers and Cellulose Fibers, Dyeing and Finishing Blends of Dacron (Iannarone Jr, Thomas and Holweger Jr) 41 (9)
Polyethylene Emulsions in Textile Applications, Use of (Rosenbaum) 46 (10)
Polyfibers with Cotton Advantages—Dyeing and Finishing Techniques, Blends of (Santymire) 45 (12)
Poly(formals) with Cellulose, Reactions of Formals and (Kress) 33 (4)
Polymers as Related to Fabric Processing (Gagliardi, Frank, Perry and Mark) 37 (11)
President, A Message from the New (Helmus) P25 (1)
President, An Invitation from the (Helmus) 81 (19)
President's Address (Helmus) 46 (22)
President's Remarks (Helmus) 56 (16)
Printing Emulsions, Colloidal Factors in Textile Pigment (Nelson) 1 (1)
Probability of a California Textile Mill (Hall) 40 (13)
Processing Aids, Synthetic and Natural Fiber and Yarn (Lighthipe and Schaubhut) 31 (13)
Processing and Dyeing, Knit Goods of Orlon Acrylic Fiber—(Turner) 48 (14)
Products Developed Since November, 1958, Alphabetical List of 67 (25)
Progress in "Wash-and-Wear" Wool (Krasny and Menkart) 114 (25)
Properties of Disperse Dyes, Relation of Dye Structure to (Salvin, Walker and Adams) 35 (14)
Properties of Fiber Glass Tapes and Fabrics, The Influence of Finishes on the (Lotz) 50 (4)
Properties of Flameproof Fabrics, Some (Sandholzer) 37 (2)
Properties of Partially Acetylated Cotton Fabrics, The Improvement of Selected Physical (Cooper Jr, Cruz, Murphy and Cashen) 43 (20)
Qualitative Chromatographic Method for Identifying Mildew Inhibitors on Military Fabrics (Miles and Delasanta) 31 (7)
Quantitative Measurement of Fabric Appearance——— Practical Evaluation of Wash and Wear Characteristics (Williams) 37 (4)
Ratings: Subjective and Objective, "Wash-and-Wear" (Washington Section) 57 (21)
Rayon, Package Dyeing Blended Yarns of 80% Zefran and 20% Cotton or Burgess) 35 (10)
Reactions of Formals and Poly(formals) with Cellulose (Kress) 33 (4)
Reactive Dyestuffs (Caswell) 39 (10)
Rechroming of Chrome-dyed Wool Pieces, The Demetalization, Leveling and (Millson) 47 (18)
Recipients, 1959 Student Award 44 (13)
Relation of Dye Structure to Properties of Disperse Dyes (Salvin, Walker and Adams) 35 (14)
Research, AATCC's Contribution to Industry through (Dorn) P10 (1)
Research at Work, AATCC (AATCC Technical Committee on Research) P10 (1)
Research Developments———AATCC Committee on Colorfastness to Washing (Lyon) 50 (16)
Research Developments———AATCC Committee on Damage Caused by Retained Chlorine (Aurich) P14 (1), 51 (16)
Research Developments———AATCC Committee on Dimensional Changes in Textile Fabrics (Warner) 55 (16)
Research Developments———Committee on Colorfastness to Light (Norton) P12 (1)
Research Developments———Committee on Colorfastness to Washing (Smith) P18 (1)
Research Developments———Committee on Dimensional Changes in Textile Fabrics (Artim) P21 (1)

Research Developments———Committee on Drycleaning Test Methods (Johnson) P17 (1)
Research Developments———Committee on Wash and Wear (Richardson) P20 (1)
Research, Mill Management and Piedmont (Browder) 18 (24)
Research———The Development of a "Wash-Wear" Finish, An Adventure in (Goldstein) 44 (5)
Resin-treated Percales, Performance of Selected (Golden, Stevens and Richey) 29 (17)
Retained Chlorine, Damage Caused by (AATCC Committee on Damage Caused by Retained Chlorine) P5 (1)
Removal of Metal Ions from Cotton Fabrics, A Study of (Rhode Island Section) 27 (26)

RHODE ISLAND SECTION———
Activities 58 (5), 74 (8), 53 (11), 59 (22), 36 (24), 40 (26)
Salts and Oxides as Finishes for Cotton, An Investigation of Inorganic (Esteve Jr, Wright and Mack) 139 (19)
Salts, Dyeing with Direct Dyes———The Effect of Various (Southeastern Section) 51 (21)
Silicone Finishes in the Textile Industry, Development of (Rossiter) 47 (7)
Size, Introducing a New Starch (Casey) 47 (7)

SOUTH CENTRAL SECTION———
Activities P62 (2), 75 (8), 61 (18), 51 (20), 36 (24)
South Central Section History 95 (19)

SOUTHEASTERN SECTION———
Activities P29 (1), 58 (6), 75 (8), 53 (11), 58 (16), 61 (18), 58 (22), ... 40 (26)
Southeastern Section History (Haynes) 96 (19)
Starch Size, Introducing a New (Casey) 47 (7)
Static Pressure in Drying Yarn Packages? Why Use (Craig) 50 (20)
Statistical Plan, A Report on AATCC's Interlaboratory (Johnson) 54 (16)
Student Award Recipients, 1959 ..... 44 (13)
Surfactants—Present & Future (Bergman) 41 (7)
Synthetic and Natural Fiber and Yarn Processing Aids (Lighthipe and Schaubhut) 31 (13)
Synthetic Fibers, Identification of Unknown (Smith) 35 (6), 23 (26)
Tapes and Fabrics, The Influence of Finishes on the Properties of Fiber Glass (Lotz) 50 (4)

TECHNICAL COMMITTEE ON RESEARCH (Minutes)———
197th Meeting 35 (6)
198th Meeting 51 (10)
199th Meeting 58 (23)

TECHNICAL LITERATURE 67 (6), 92 (8), 65 (15), 51 (24), 149 (25)
Techniques for Union Dyeing Blends of Zefran and Cotton with Vat Dyes (Burgess) 19 (24)
Test Methods, Research Developments———Committee on Drycleaning (Johnson) P17 (1)
Tester, Evaluation of the Celanese Wrinkle (Kaswell) 56 (7)
Testing, An Improved Crockmeter for Yarn (Korpanty and Trommer) 40 (6)
Tetrahydropyrimidinone Derivatives for Nonchlorine-retentive, Wrinkle-resistant Cotton Fabrics (Frick Jr, Kottes and Reid) 23 (13)
Thickening Agents in Padding with Ultrasperse Vat Dyestuffs, The Effect of (Kern) 57 (12)
Treatments of Cotton Tubular Knitgoods, Chemical (Goldstein) 45 (8)
Trends in Bleaching, Present-day (Easton) 24 (24)
Triacetate Blends, Dyeing of Acetate Blends and Arnel (Salvin) 49 (7)
Triazone and Urea Derivatives for Wrinkle-resistant Cotton Fabrics, Chlorine-resistant Blends of (Frick Jr, Arceneaux, Reinhardt and Reid) 29 (15)
Triazone Derivatives, Imparting Wrinkle Resistance to Cotton Fabrics with (Reid, Frick Jr, Reinhardt and Arceneaux P81 (3)
Tubular Knitgoods, Chemical Treatments of Cotton (Goldstein) 45 (8)
Ultrasperse Vat Dyestuffs, The Effect of Thickening Agents in Padding with (Kern) 57 (12)
Union Dyeing Blends of Zefran and Cotton with Vat Dyes, Techniques for (Burgess) 19 (24)
Urea Derivatives for Wrinkle-resistant Cotton Fabrics, Chlorine-resistant Blends of Triazone and (Frick Jr, Arceneaux, Reinhardt and Reid) 29 (15)
Valko, Chapin and Williams Honored at Awards Luncheon 48 (22)
Valko—16th Olney Medalist, Emery I 109 (19)
Valko, 1959 Olney Medalist, Remarks by Emery I 49 (22)
Vat Dyeing of Cotton and Viscose Packages (Bardt) 43 (6)
Vat Dyes, Techniques for Union Dyeing Blends of Zefran and Cotton with (Burgess) 19 (24)
Vat Dyestuffs, The Effect of Thickening Agents in Padding with Ultrasperse (Kern) 57 (12)
Vice Presidents, Greetings from the (Parks, Anderson, Smith and Morrill) 82 (19)
Viscose Packages, Vat Dyeing of Cotton and (Bardt) 43 (6)
"Wash and Wear"———A Progress Report (Richardson) 44 (16)
Wash and Wear Characteristics of Cellulosic Fabrics, Mechanisms Influencing the (Williams) 27 (13)
Wash and Wear Characteristics, Quantitative Measurement of Fabric Appearance—Practical Evaluation of (Williams) 37 (4)
"Wash-and-Wear" Ratings:Subjective and Objective (Washington Section) 57 (21)
Wash and Wear, Research Developments———Committee on (Richardson) P20 (1)
"Wash-and-Wear" Wool, Progress in (Krasny and Menkart) 114 (25)
"Wash-and-Wear" Wool, Some Factors Involved in (Krasny, Harris, Lourigan and White) 31 (18)
"Wash-Wear" Finish, An Adventure in Research—The Development of a (Goldstein) 44 (5)
Washing, Research Developments———AATCC Committee on Colorfastness to (Lyon) 50 (16)
Washing, Research Developments———Committee on Colorfastness to (Smith) P18 (1)
Washington Convention ..... (See Convention, National (Washington))
Washington Convention Attracts 1680 Registrants 42 (22)
Washington Section History (Graham) 97 (19)
Waste Clarification, Nonionic Detergents in Raw-Wool Scouring Including Studies in (Fong) P45 (2)
Water-soluble Gums, Important Factors to Consider When Selecting (Ferri) 32 (14)
Wear by Means of the Accelerotor, Abrasion Resistance of Fabrics: Evaluation of (AATCC Committee on Resistance to Abrasion) 127 (19)

WESTERN NEW ENGLAND SECTION———
Activities P29 (1), 74 (8), 59 (10), 54 (12), 46 (13), 46 (15), 56 (22), 36 (24)
Wet Processing of Cotton-Acrilan Work-clothing Fabrics, The Continuous (South Central Section) 35 (22)
Whiteners and Oxidizing Bleaches on Cotton, Evaluating the Effectiveness of Fluorescent (Furry, Bensing, Kirkley, Taube, Poole and Ross) 59 (8)
Williams, 1959 American Dyestuff Reporter Award Winner, Remarks by Charles R 48 (22)
Williams Honored at Awards Luncheon, Valko, Chapin and 48 (22)
Wool at Subboiling Temperatures, Dyeing of (Schmitt) 40 (18)
Wool Pieces, The Demetalization, Leveling and Rechroming of Chrome-dyed (Millson) 47 (18)
Wool Pretreated to Produce Contrast Effects, The Dyeing of (Postman) 43 (4)
Wool, Progress in "Wash-and-Wear" (Krasny and Menkart) 114 (25)
Wool Scouring Including Studies of Waste Clarification, Nonionic Detergents in Raw- (Fong) P45 (2)
Wool, Some Factors Involved in "Wash-and-Wear" (Krasny, Harris, Lourigan and White) 31 (18)
Work-clothing Fabrics, The Continuous Wet Processing of Cotton-Acrilan (South Central Section) 35 (22)
Wrinkle Resistance to Cotton Fabrics with Triazone Derivatives, Imparting (Reid, Frick Jr, Reinhardt and Arceneaux) P81 (3)
Wrinkle Tester, Evaluation of the Celanese (Kaswell) 56 (7)
Wrinklemeter, Optical (Hunter and Lofland) 54 (8)
Yarn Testing, An Improved Crockmeter for (Korpanty and Trommer) 40 (6)
Year, Highlights of the Past (Wood) 99 (25)
Zefran and 20% Cotton or Rayon, Package Dyeing Blended Yarns of 80% (Burgess) 35 (10)
Zefran and Cotton with Vat Dyes, Techniques for Union Dyeing Blends of (Burgess) 19 (24)

INDEX BY AUTHOR

AATCC COMMITTEE ON ANTIBACTERIAL AGENTS———
Detection of Antibacterial Property of Fabrics; Agar Plate Method P8 (1)
AATCC COMMITTEE ON DAMAGE CAUSED BY RETAINED CHLORINE———
Damage Caused by Retained Chlorine P5 (1)
AATCC COMMITTEE ON DIMENSIONAL CHANGES IN TEXTILE FABRICS———
Dimensional Restorability of Woven Textiles After Laundering 133 (19)
AATCC COMMITTEE ON IDENTIFICATION OF FINISHES ON TEXTILES———
Analysis of Finish in Textiles 129 (19)
AATCC COMMITTEE ON RESISTANCE TO ABRASION———
Abrasion Resistance of Fabrics: Evaluation of Wear by Means of the Accelerotor 127 (19)
AATCC TECHNICAL COMMITTEE ON RESEARCH———
AATCC Research at Work (A Symposium) P10 (1)
ADAMS, CLEVELAND L———
A History of Textile Education in the Southern Region——Alabama Polytechnic Institute 98 (19)
ALLEN, EUGENE———
Why Does the Fluorescence of Optical Bleaches Reach a Limit? 27 (14)
ARCENEAUX, RICHARD L; REID, J DAVID; FRICK JR, J G; MURPHY JR, PAUL J; and REINHARDT, ROBERT M———
Wrinkle-resistant Cotton With Durable Chlorine Resistance 37 (18)
ARCENEAUX, RICHARD L; REID, J DAVID; FRICK JR, J G; and REINHARDT, ROBERT M———
Imparting Wrinkle Resistance to Cotton Fabrics with Triazone Derivatives P81 (3)
ARCENEAUX, RICHARD L; REINHARDT, ROBERT M; REID, J DAVID; and FRICK, J G———
Chlorine-Resistant Blends of Triazone and Urea Derivatives for Wrinkle-resistant Cotton Fabrics 29 (15)
ARTIM, EDWARD———
Research Developments———Committee on Dimensional Changes in Textile Fabrics P21 (1)
AURICH, RICHARD F———
Research Developments———Committee on Damage Caused by Retained Chlorine P14 (1), 51 (16)
BARACH, J L, and COATES,H W———
Acetate—A Basic Fiber for Nonwovens 43 (11)
BARDT, KLAUS J———
Vat Dyeing of Cotton and Viscose Packages 43 (6)
BELL, WILLIAM, and BIDGOOD JR, LEE———
Recent Developments in Dyeing Orlon P51 (2)
BENSING, P L; KIRKLEY, J L; and FURRY, M S———
Evaluating the Effectiveness of Fluorescent Whiteners and Oxidizing Bleaches on Cotton. Part I—Unsoiled Swatches Washed in Launder-Ometer 59 (8)

BENSING, P L ; TAUBE, R K; POOLE, N D; ROSS, E S; and FURRY, M S——
Evaluating the Effectiveness of Fluorescent Whiteners and Oxidizing Bleaches on Cotton—Part II—Naturally Soiled Pillowcases Washed and Dried in Household Equipment 67 (8)
BERGMAN, CARL A——
Surfactants—Present and Future 41 (7)
BIDGOOD JR, LEE, and BELL, WILLIAM——
Recent Developments in Dyeing Orlon P51 (2)
BROWDER, BASIL D——
Management and Piedmont Research 18 (24)
BURGESS, ROBERT L——
Package Dyeing Blended Yarns of 80% Zefran and 20% Cotton or Rayon 35 (10)
Techniques for Union Dyeing Blends of Zefran and Cotton with Vat Dyes 19 (24)
BURNTHALL, E V——
Recent Advances in the Dyeing of Acrilan Acrylic Fiber 41 (10)
CALDWELL, WILLIAM C——
Organic Chemicals for Textile Finishing—Field with a Future 37 (7)
CASEY, JAMES P——
Introducing a New Starch Size 47 (7)
CASHEN, CONSTANCE F; COOPER JR, A S; CRUZ, MANUEL D; and MURPHY, ALTON S——
The Improvement of Selected Physical Properties of Partially Acetylated Cotton Fabrics 43 (20)
CASWELL, E L——
Reactive Dyestuffs 39 (10)
COATES, H W, and BARACH, J L——
Acetate—A Basic Fiber for Nonwovens 43 (11)
COOPER JR, A S; CRUZ, MANUEL D; MURPHY, ALTON S; and CASHEN, CONSTANCE F——
The Impovement of Selected Physical Properties of Partially Acetylated Cotton Fabrics 43 (20)
CRAIG, RAY P——
Why Use Static Pressure in Drying Yarn Packages? 50 (20)
CRUZ, MANUEL D; MURPHY, ALTON S; CASHEN, CONSTANCE F; and COOPER JR, A S——
The Impovement of Selected Physical Properties of Partially Acetylated Cotton Fabrics 43 (20)
CURRIER, RAY L——
Inorganics—Their Place and Expected Growth Pattern 33 (7)
DAVIDS, J H; IRVINE, J B; and SIMONS, J K——
A Mild-cure Catalyst 37 (12)
DECOSSAS, K M; DRAKE JR, G L; GUTHRIE, J D; POLLARD, E F; and McMILLAN JR, O J——
Chemical Modification of Cotton: Aminization Cost Study 37 (17)
DECOSSAS, K M; McMILLAN JR, O J; REEVES, W A; GUTHRIE, J D; and POLLARD, E F——
The Continuous Carbamoylethylation of Cotton Fabric: Preliminary Cost Study 30 (14)
DELASANTA, ARMANDO C, and MILES, THOMAS D——
Qualitative Chromatographic Method for Identifying Mildew Inhibitors on Military Fabrics 31 (7)
DORN, CHARLES W——
AATCC's Contribution to Industry Through Research P10 (1)
DRAKE JR, G L; GUTHRIE, J D; POLLARD, E F; McMILLAN JR, O J; and DECOSSAS, K M——
Chemical Modification of Cotton: Aminization Cost Study 37 (17)
EASTON, BERNARD K——
Present-day Trends in Bleaching 24 (24)
EDELSTEIN, SIDNEY M——
The Thirteen Keys—Hints on Studying the History of Dyeing and Bleaching 35 (9)
"Dye Balls" and "Family Colors"——The Story of Packaged Dyes for the Home 32 (15)
ESTEVE JR, RAMON M; WRIGHT, GEORGIA ELLEN; and MACK, PAULINE BEERY——
An Investigation of Inorganic Salts and Oxides as Finishes for Cotton 139 (19)
FERRI, CHARLES M——
Important Factors to Consider when Selecting Water-Soluble Gums 32 (14)
FONG, W——
Nonionic Detergents in Raw-wool Scouring including Studies of Waste Clarification P45 (2)
FRANK, BURTON E——
History of Nonwoven Development at 3M 51 (14)
FRANK, VICTOR S; PERRY, LLOYD H; MARK, HERMAN F; GAGLIARDI, D DONALD——
Polymers as Related to Fabric Processing 37 (11)
FRICK JR, J G; ARCENEAUX, RICHARD L; REINHARDT, ROBERT M; and REID, J DAVID——
Chlorine-resistant Blends of Triazone and Urea Derivatives for Wrinkle-resistant Cotton Fabrics 29 (15)
FRICK JR, J G; KOTTES, BETHLEHEM A; and REID J DAVID——
Tetrahydropyrimidinone Derivatives for Nonchlorine Retentive, Wrinkle-resistant Cotton Fabrics 23 (13)
FRICK JR, J G; KOTTES, BETHLEHEM A; and REID, J ROBERT M; ARCENEAUX, RICHARD L; and REID, J DAVID——
Wrinkle-resistant Cotton with Durable Chlorine Resistance 37 (18)
FRICK JR, J G; REINHARDT, ROBERT M; ARCENEAUX, RICHARD L; and REID, J DAVID——
Imparting Wrinkle Resistance to Cotton Fabrics with Triazone Derivatives P81 (3)
FURRY, M S; BENSING, P L; and KIRKLEY, J L——
Evaluating the Effectiveness of Fluorescent Whiteners and Oxidizing Bleaches on Cotton. Part I—Unsoiled Swatches Washed in Launder-Ometer 59 (8)
FURRY, M S; BENSING, P L; TAUBE, R K; POOLE, N D; and ROSS, E S——
Evaluating the Effectiveness of Fluorescent Whiteners and Oxidizing Bleaches on Cotton—Part II—Naturally Soiled Pillowcases Washed and Dried in Household Equipment 67 (8)
FYNN, P J——
Analysis of Consumer Complaints P11 (1)

GAGE, GASTON——
A History of Textile Education In the Southern Region ——Clemson College 99 (19)
GAGLIARDI, D DONALD; FRANK, VICTOR S; PERRY, LLOYD H; and MARK, HERMAN F——
Polymers as Related to Fabric Processing 37 (11)
GLARUM, S N——
Modern Finishes for Modern Fabrics 41 (5)
GOLDSTEIN, HERMAN B——
An Adventure in Research—The Development of a "Wash-Wear" Finish 44 (5)
Chemical Treatments of Cotton Tubular Knitgoods 45 (8)
GOLDEN, JEWEL; STEVENS, HAZEL T; and RICHEY, HELEN L——
Performance of Selected Resin-Treated Percales 29 (17)
GRAHAM, ROBERT T——
The Sections of the Southern Region—Washington Section 97 (19)
GRAJECK, EDWIN J, and PETERSEN, WILLIAM H——
Fluorchemicals: The New Idea in Textiles 37 (13)
GUTHRIE, J D; POLLARD, E F; DECOSSAS, K M; McMILLAN JR, O J; and REEVES, W A——
The Continuous Carbamoylethylation of Cotton Fabric: Preliminary Cost Study 30 (14)
GUTHRIE, J D; POLLARD, E F; McMILLAN JR, O J; DECOSSAS, K M; and DRAKE JR, G L——
Chemical Modification of Cotton: Aminization Cost Study 37 (17)
HALL, A C——
Probability of a California Textile Mill 40 (13)
HARRIS, HAZEL E; LOURIGAN, GEORGE H; WHITE, ELEANOR D; and KRASNY, JOHN F——
Some Factors involved in "Wash-and-Wear" Wool 31 (18)
HARRISON, G K, and MARSH, P B——
Detection and Geographical Origin of Iron-spotted Raw Cotton 47 (21)
HAYNES, A KEMPTON——
The Sections of the Southern Region—Southeastern 96 (19)
HELMUS, WELDON G——
A Message from the New President P25 (1)
President s Remarks 56 (15)
Invitation to the 1959 AATCC Convention 81 (19)
President's Address 46 (22)
HOLWEGER JR, C W; IANNARONE JR, J J; and THOMAS, R J——
Dyeing and Finishing Blends of Dacron Polyester Fibers and Cellulose Fibers 41 (9)
HORTON, RICHARD C——
The Finishing and Dyeing of Fiber Glass Drapery Fabrics 48 (4)
HUNTER, RICHARD S, and LOFLAND, CLYDE A——
Optical Wrinklemeter 54 (8)
IANNARONE JR, J J; THOMAS, R J; and HOLWEGER JR, C W——
Dyeing and Finishing Blends of Dacron Polyester Fiber and Cellulose Fibers 41 (9)
IRVINE, J B; SIMONS, J K; and DAVIDS, J H——
A Mild-cure Catalyst 37 (12)
IVEY JR, W R——
Dyeing and Finishing of Kodel Fiber and Fabrics 94 (3)
JOHNSON, ALBERT E——
Research Developments——Committee on Drycleaning Test Methods P17 (1)
A Report on AATCC's Interlaboratory Statistical Plan 54 (16)
JOHNSON, GEORGE H——
The Importance of AATCC to the Textile Industry and the Consumer P23 (1)
KASWELL, ERNEST R——
Evaluation of the Celanese Wrinkle Tester 56 (7)
KERN, R——
The Effect of Thickening Agents in Padding with Ultrasperse Vat Dyestuffs 57 (12)
Continuous Development of Direct, Developed Dyeings 36 (17)
KIRKLEY, J L; FURRY, M S; and BENSING, P L——
Evaluating the Effectiveness of Fluorescent Whiteners and Oxidizing Bleaches on Cotton. Part I—Unsoiled Swatches Washed in Launder-Ometer 59 (8)
KORPANTY, STEPHEN, and TROMMER, CHARLES R——
An Improved Crockmeter for Yarn Testing 40 (6)
KOTTES, BETHLEHEM A; REID, J DAVID; and FRICK JR, J G——
Tetrahydropyrimidinone Derivatives for Nonchlorine Retentive, Wrinkle-resistant Cotton Fabrics 23 (13)
KRASNY, JOHN F, and MENKART, JOHN——
Progress in "Wash-and-Wear" Wool 114 (25)
KRASNY, JOHN F; HARRIS, HAZEL E; LOURIGAN, GEORGE H; and WHITE, ELEANOR D——
Some Factors Involved in "Wash and-Wear" Wool 31 (18)
KRESS, BERNARD H——
Reactions of Formulas and Poly (Formals) with Cellulose 33 (4)
LACHUT, FRANK J——
Decorative Fabrics from Fibrous Glass 43 (12)
LaGASSE, P N, and TAYLOR JR, A R——
Impoving the Hand of Fabrics of Dacron 77 (3)
LESH, ROBERT M; THACKRAH, JOHN S; and PERCARPIO, FRANK J——
Practical Experience with the Pad-Roll Dyeing Machine 41 (15)
LIGHTHIPE, CHARLES H, and SCAUBHUT, RALPH G——
Synthetic and Natural Fiber and Yarn Processing Aids 31 (13)
LINBERG, GEO O——
The Textile Finishers' Challenge to the Chemical Industry 44 (7)
LOFLAND, CLYDE A, and HUNTER, RICHARD S——
Optical Wrinklemeter 54 (8)
LOTZ, EDWIN L——
The Influence of Finishes on the Properties of Fiber Glass Tapes and Fabrics 50 (4)
LOURIGAN, GEORGE H; WHITE, ELEANOR D; KRASNY, JOHN F; and HARRIS, HAZEL E——
Some Factors Involved in "Wash-and-Wear" Wool 31 (18)
LYON, VIRGIL D——
Research Developments——AATCC Committee on Colorfastness to Washing 50 (16)
MACK, CHARLES H, and REEVES, WILSON A——
Durable Creases Produced in Cotton and Resin-finished Cotton Fabrics by an Alkali Process 43 (21)
MACK, PAULINE BEERY; ESTEVE JR, RAMON M; and WRIGHT, GEORGIA ELLEN——
An Investigation of Inorganic Salts and Oxides as Finishes for Cotton 139 (19)
MAJORS, PAUL A——
Evaluation of the Effectiveness of Antibacterial Finishes for Cloth P91 (3)

MARK, HERMAN F; GAGLIARDI, D DONALD; FRANK, VICTOR S; PERRY, LLOYD H———
Polymers as Related to Fabric Processing 37 (11)
MARSH, P B, and HARRISON, G K———
Detection and Geographical Origin of Iron-spotted Raw Cotton 47 (21)
McMILLAN JR, O J; DECOSSAS, K M; DRAKE JR, G L; GUTHRIE, J D; and POLLARD, E F———
Chemical Modification of Cotton: Aminization Cost Study 37 (17)
McMILLAN JR, O J; REEVES, W A; GUTHRIE, J D; POLLARD, E F; and DECOSSAS, K M———
The Continuous Carbamoylethylation of Cotton Fabric: Preliminary Cost Study 30 (14)
MENKART, JOHN, and KRASNY, JOHN F———
Progress in "Wash-and-Wear" Wool 114 (25)
MERIAN, ERNEST———
The Chemistry of the Aminonaphthoquinones 31 (20)
MEYER, F G C———
Europe's Model Textile Finisher 31 (11)
MILES, THOMAS D, and DELASANTA, ARMANDO C———
Qualitative Chromatographic Method for Identifying Mildew Inhibitors on Military Fabrics 31 (7)
MILLSON, HENRY E———
The Demetalization, Leveling and Rechroming of Chrome-dyed Wool Pieces 47 (18)
MURPHY, ALTON S; CASHEN, CONSTANCE F; COOPER JR, A S; and CRUZ, MANUEL D———
The Improvement of Selected Physical Properties of Partially Acetylated Cotton Fabrics 43 (20)
MURPHY JR, PAUL J; REINHARDT, ROBERT M; ARCENEAUX, RICHARD L; REID, J DAVID; and FRICK JR, J G———
Wrinkle-resistant Cotton with Durable Chlorine Resistance 37 (18)
NELSON, ELLIOT———
Colloidal Factors in Textile Pigment Printing Emulsions 1 (1)
NORTON, JOSEPH E———
Research Developments———Committee on Colorfastness to Light P12 (1), 48 (16)
NORTHERN NEW ENGLAND SECTION———
Pile Fabrics 103 (25)
PERCARPIO, FRANK J; LESH, ROBERT M; and THACKRAH, JOHN S———
Practical Experience with the Pad-Roll Dyeing Machine 41 (15)
PERRY, LLOYD H; MARK, HERMAN F; GAGLIARDI, D DONALD; and FRANK, VICTOR S———
Polymers as Related to Fabric Processing 37 (11)
PETERSEN, WILLIAM, H and GRAJECK, EDWIN J———
Fluorochemicals: The New Idea in Textiles 37 (13)
PIEDMONT SECTION, AATCC———
Accelerant Dyeing of Hydrophobic Fibers—Principles and Mechanisms 23 (22), 37 (23)
PLATNICK, LEONARD H———
Milan International Textile Machinery Exhibit 125 (25)
POLLARD, E F; DECOSSAS K M; McMILLAN JR, O J; REEVES, W A; and GUTHRIE, J D———
The Continuous Carbamoylethylation of Cotton Fabric: Preliminary Cost Study 30 (14)
POLLARD, E F; McMILLAN JR, O J; DECOSSAS, K M; DRAKE JR, G L; and GUTHRIE, J D———
Chemical Modification of Cotton: Aminization Cost Study 37 (17)
POOLE, N D; ROSS, E S; FURRY, M S; BENSING, P L; and TAUBE, R K———
Evaluating the Effectiveness of Fluorescent Whiteners and Oxidizing Bleaches on Cotton—Part II—Naturally Soiled Pillowcases Washed and Dried in Household Equipment 67 (8)
POSTMAN, WILLIAM———
The Dyeing of Wool Pretreated to Produce Contrast Effects 43 (4)
REDSTON, J P———
The Practical Application and Control of Dieldrin for Durable Mothproofing 49 (6)
REEVES, W A; GUTHRIE, J D; POLLARD, E F; DECOSSAS, K M; and McMILLAN JR, O J———
The Continuous Carbamoylethylation of Cotton Fabric: Preliminary Cost Study 30 (14)
REEVES, WILSON A, and MACK, CHARLES H———
Durable Creases Produced in Cotton and Resin-Finished Cotton Fabrics by an Alkali Process 43 (21)
REID, J DAVID; FRICK JR, J G; ARCENEAUX, RICHARD L; and REINHARDT, ROBERT M———
Chlorine-Resistant Blends of Triazone and Urea Derivatives for Wrinkle-resistant Cotton Fabrics 29 (15)
REID, J DAVID; FRICK JR, J G; and KOTTES, BETHLEHEM A———
Tetrahydropyrimidinone Derivatives for Nonchlorine Retentive, Wrinkle-resistant Cotton Fabrics 23 (13)
REID, J DAVID; FRICK JR, J G; MURPHY JR, PAUL J; REINHARDT, ROBERT M; and ARCENEAUX, RICHARD L———
Wrinkle-resistant Cotton with Durable Chlorine Resistance 37 (18)
REID, J DAVID; FRICK JR, J G; REINHARDT, ROBERT M; and ARCENEAUX, RICHARD L———
Imparting Wrinkle Resistance to Cotton Fabrics with Triazone Derivatives P31 (3)
REINHARDT, ROBERT M; ARCENEAUX, RICHARD L; REID, J DAVID; and FRICK JR, J G———
Imparting Wrinkle Resistance to Cotton Fabrics with Triazone Derivatives P81 (3)
REINHARDT, ROBERT M; ARCENEAUX, RICHARD L; REID, J DAVID; FRICK JR, J G; and MURPHY JR, PAUL J———
Wrinkle-resistant Cotton with Durable Chlorine Resistance 37 (18)
REINHARDT, ROBERT M; REID, J DAVID; FRICK JR, J G; and ARCENEAUX, RICHARD L———
Chlorine-resistant Blends of Triazone and Urea Derivatives for Wrinkle-resistant Cotton Fabrics 29 (15)
RHODE ISLAND SECTION, AATCC———
A Study of the Removal of Metal Ions from Cotton Fabrics 27 (26)
RICHARDSON, GRAHAM H———
Research Developments———Committee on Wash and Wear P20 (1)
"Wash-and-Wear"—A Progress Report 44 (16)
RICHEY, HELEN L; GOLDEN, JEWEL; and STEVENS, HAZEL T———
Performance of Selected Resin-treated Percales 29 (17)
RIDLEY, WALTER H———
Instrumentation—An Integral Part of Dyeing and Finishing 37 (15)
RINGEISSEN, M———
Care Labelling Code for Textile Articles in Europe 29 (16)
ROSENBAUM, R———
Use of Polyethylene Emulsions in Textile Applications .. 46 (10)
ROSS, E S; FURRY, M S; BENSING, P L; TAUBE, R K; and POOLE, N D———
Evaluating the Effectiveness of Fluorescent Whiteners and Oxidizing Bleaches on Cotton—Part II—Naturally Soiled Pillowcases Washed and Dried in Household Equipment 67 (8)
ROSSITER, W T———
Development of Silicone Finishes in the Textile Industry 47 (7)
RUTHERFORD, HENRY A———
A History of Textile Education in the Southern Region—North Carolina State College 101 (19)

SALVIN, V S, and WALKER, R A———
Relation of Dye Structure to Properties of Disperse Dyes 35 (14)
SALVIN, VICTOR S———
Dyeing of Acetate Blends and Arnel Triacetate Blends .. 59 (7)
SANDHOLZER, MARJORIE W———
Some Properties of Flameproof Fabrics 37 (2)
SANTYMIRE, MORTON———
Blends of Polyfibers with Cotton Advantages—Dyeing and Finishing Techniques 45 (12)
SCHAUBHUT, RALPH G and LIGHTHIPE, CHARLES H———
Synthetic and Natural Fiber and Yarn Processing Aids .. 31 (13)
SCHMITT, C H A———
Dyeing of Wool at Subboiling Temperatures 40 (18)
SHAILER JR, L L———
Expanding the Market for Nonwoven Fabrics 41 (4)
SIMONS, J K; DAVIDS, J H; and IRVINE, J B———
A Mild-cure Catalyst 37 (12)
SMITH, A R———
Some Observations Regarding the Chlorine Retention of Fabrics Treated with Dimethylol Ethyleneurea 49 (8)
SMITH, RALPH B———
Research Developments———Committee on Colorfastness to Washing P18 (1)
SMITH, SIDNEY G———
Identification of Unknown Synthetic Fibers. Part II—Application of Polarized Light Microscopy 35 (6)
Part III—Revisions and Application of Micro Fusion 23 (26)
SOUTH CENTRAL SECTION, AATCC———
The Continuous Wet Processing of Cotton-Acrilan Workclothing Fabrics 35 (22)
SOUTHEASTERN SECTION, AATCC———
Dyeing with Direct Dyes—The Effect of Various Salts 51 (21)
STEVENS, HAZEL T; RICHEY, HELEN L, and GOLDEN, JEWEL———
Performance of Selected Resin-treated Percales 29 (17)
SYLVESTER, C A———
AATCC Looks Ahead 43 (16)

TAUBE, R K; POOLE, N D; ROSS, E S; FURRY, M S; and BENSING, P L———
Evaluating the Effectiveness of Fluorescent Whiteners and Oxidizing Bleaches on Cotton—Part II—Naturally Soiled Pillowcases Washed and Dried in Household Equipment 67 (8)
TAYLOR, JAMES L———
A History of Textile Education in the Southern Region—Georgia Institute of Technology 100 (19)
TAYLOR, JOHN T———
Chemicals for Nonwoven Fabrics 49 (5)
TAYLOR JR, A R, and LaGASSE, P N———
Impoving the Hand of Fabrics of Dacron 77 (3)
THACKRAH, JOHN S; PERCARPIO, FRANK J; and LESH, ROBERT M———
Practical Experience with the Pad-Roll Dyeing Machine 41 (15)
THOMAS, R J; HOLWEGER JR, C W; and IANNARONE JR, J J———
Dyeing and Finishing Blends of Dacron Polyester Fibers and Cellulose Fibers 41 (9)
THOMPSON, ARTHUR R———
The Sections of the Southern Region—Piedmont Section 93 (19)
TROMMER, CHARLES R, and KORPANTY, STEPHEN———
An Improved Crockmeter for Yarn Testing 40 (6)
TURNER, G ROBERT———
Knit Goods of Orlon Acrylic Fiber—Processing and Dyeing 48 (14)

WALKER, R A, and SALVIN, V S———
Relation of Dye Structure to Properties of Disperse Dyes 35 (14)
WARNER, JOHN F———
Research Developments———AATCC Committee on Dimensional Changes in Textile Fabrics 55 (16)
WASHINGTON SECTION, AATCC———
"Wash-and-Wear" Ratings: Subjective and Objective .. 57 (21)
WENGRAF, PAUL———
Patent Digest 44 (2)
63 (10), 65 (12), 57 (14), 36 (15), 63 (16), 49 (17), 44 (18)
WHITE, ELEANOR D; KRASNY, JOHN F; HARRIS, HAZEL E; and LOURIGAN, GEORGE H———
Some Factors Involved in "Wash-and-Wear" Wool 31 (18)
WICH, EMIL A———
A Breakthrough In Pigment Technology—The New Yellow-Green Phthalocyanine 42 (18)
WILLIAMS, CHARLES A———
Quantitative Measurement of Fabric Appearance—Practical Evaluation of Wash and Wear Characteristics 37 (4)
Mechanisms Influencing the Wash and Wear Characteristics of Cellulosic Fabrics 27 (13)
WOOD P J———
Inter Alia—Inter Nos ..... 65 (2), 61 (4), 61 (6), 79 (8), 61 (1),0 48 (13), 47 (15), 45 (17), 145 (19), 65 (21), 43 (24), 41 (26)
Highlights of the Past Year 99 (25)
WRIGHT, GEORGIA ELLEN; MACK, PAULINE BEERY; and ESTEVE JR, RAMON M———
An Investigation of Inorganic Salts and Oxides as Finishes for Cotton 139 (19)

COLOUR INDEX NOW COMPLETE!

ALL FOUR VOLUMES
OF THE NEW

COLOUR INDEX

NOW AVAILABLE

The First Edition of the COLOUR INDEX was published in 1924 and now, thirty-four years later, the Second Edition is ready for you. You cannot afford to wait for some future edition. There is no other up-to-date index of world coloring matters.

Your prepaid subscription received promptly will insure your possession of this LIMITED EDITION, a tremendously valuable work on the free world's dyestuffs and pigments in commercial use. Published by the Society of Dyers and the Colourists (British) and the American Association of Textile Chemists and Colorists, these four volumes totaling 3152 pages provide the only complete reference of coloring matters available to those interested in this field. They include information on methods of application and fastness properties of coloring matters furnished by world manufacturers, chemical and structural information, characteristic reaction, index of products and trade names, fastness tests and rating methods, new and old COLOUR INDEX NUMBERS, Schultz and AATCC prototype numbers and a hue indication chart.

PREPAID SUBSCRIPTION FOR THE FOUR VOLUMES IS $112.00 PER SET, PACKAGED AND DELIVERED

ORDER NOW FROM:

American Association of Textile Chemists and Colorists

PO Box 28, Lowell, Massachusetts

New SANDOZ Foron® dyes up-grade fastness on polyester fibers

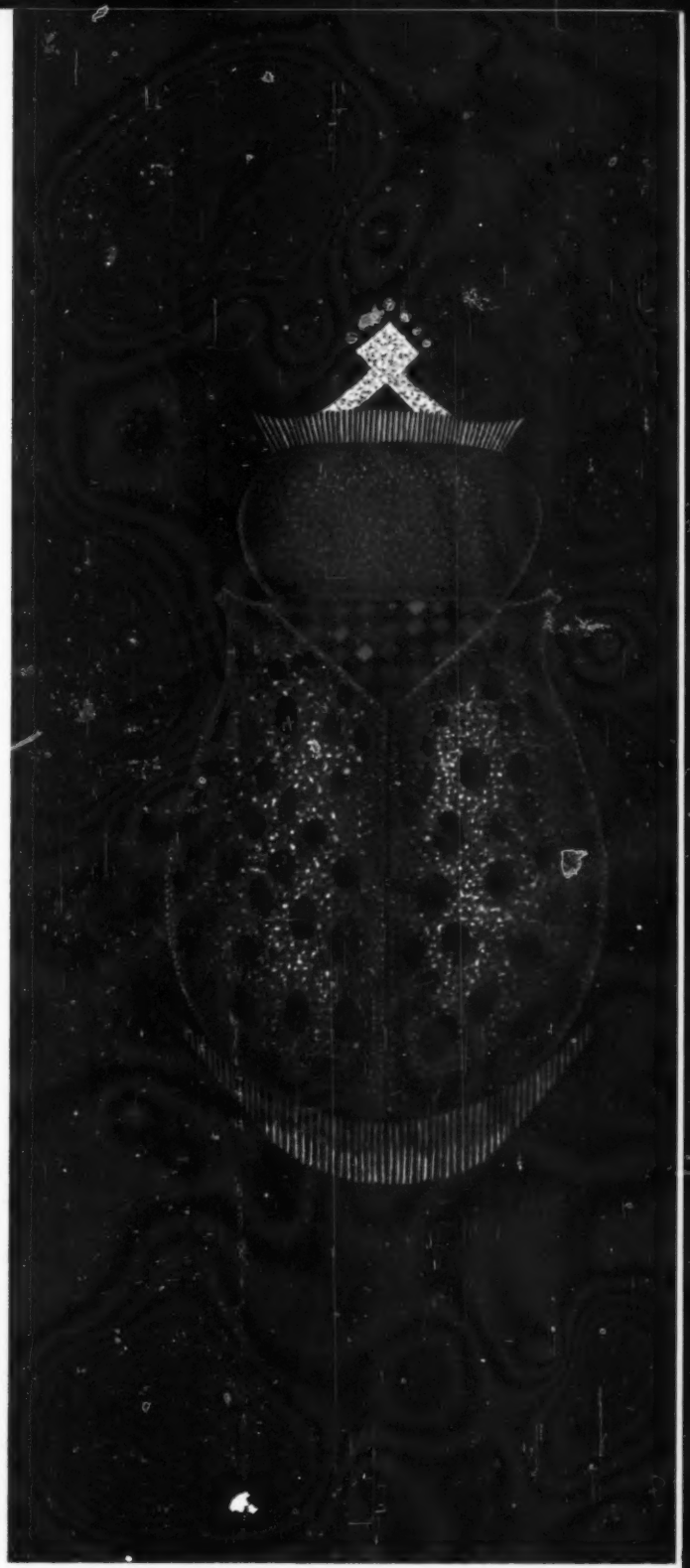
For an outstanding improvement in color fastness on polyester fibers, try the new SANDOZ Foron ultra-disperse dyes. Popular shades on these fibers can be matched now with available Foron dyes, and new dyes are being added rapidly.

SANDOZ Foron dyes have high affinity for polyester fibers in dyeing and printing, and provide excellent light fastness, wet fastness, and resistance to abrasion.

Recommended for coloring 100% polyester fibers, blends of polyesters with cotton or viscose rayon, and blends of polyester and wool. For a complete exposition of what these new dyes can do for you, call in a SANDOZ representative.

SANDOZ, INC., 61-63 Van Dam Street, New York 13, New York. ALgonquin 5-1700.

District Offices: Charlotte, Cincinnati, Fair Lawn, N. J., Hudson, Mass., Los Angeles, Philadelphia.



SANDOZ

THINKS AHEAD WITH TEXTILES

SANDOZ

News of the Trade

Eastman Increases Dye Prices

An increase in the price of ten of its disperse dyes for synthetic fibers has been announced by Eastman Chemical Products, Inc, subsidiary of Eastman Kodak Company. The new price will go into effect January 1, 1960.

"While the costs of raw materials, labor and freight have risen sharply during the past three years," an Eastman spokesman pointed out, "this is the first increase involving more than one or two of our dyes since 1957."

Increases will range from 4¢/lb for Eastone Rubine R to 39¢/lb for Eastman Yellow 5G Conc.

List of dyes affected by price increase announcement:

	Present price	*Price effective January 1, 1960*
Eastone Yellow GN conc	$2.08	$2.18
Eastone Yellow 5G conc	3.65	3.94
Eastman Orange GRN conc	1.70	1.84
Eastone Rubine R	1.32	1.36
Eastone Scarlet BG	1.70	1.79
Eastman Fast Violet 5RLF	4.54	4.76
Eastman Black SN	1.05	1.13
Eastman Polyester Diazo Black B	.89	.96
Eastman Blue GBN	1.65	1.78
Eastman Blue BNN	1.65	1.78

•

UUCC Appoints Baumstark & Co as Sales Representative

The United Ultramarine & Chemical Company, Inc, has appointed Harry A Baumstark & Co, 6801 Arsenal Street, St Louis 9, Mo, sales representative.

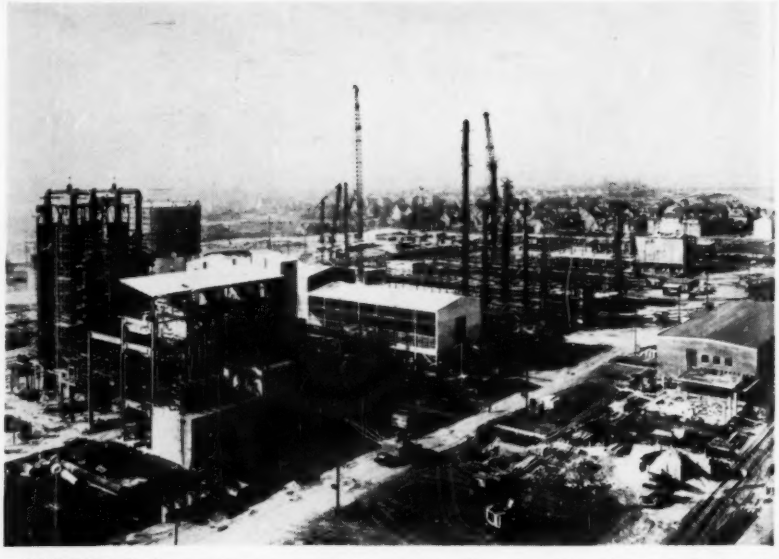
The territory of the new representative includes eastern Missouri, northern Arkansas, southern Illinois including Peoria, and southeastern Iowa including Burlington and Fort Madison.

The firm's complete line of ultramarine pigments will be represented, including reds, violets, greens and blues.

•

PTI Honors John B Kelly Sr

Sweeping changes in labor-management relations including the outlawing of all strikes and the creation of a supreme court of labor were proposed last month by John B Kelly Sr, speaking before an audience of 800 persons at the Bellevue-Stratford Hotel at a tribute dinner in his honor sponsored by the Philadelphia Textile Institute.



HOECHST high-temperature pyrolysis process plant at main plant of Farbwerke Hoechst AG, Frankfurt-Hoechst, Germany, is nearing completion. Process is for the production of acetylene and ethylene from hydrocarbons.

Kelly was cited for his achievement as a civic and business leader and a staunch supporter of the Institute. The affair was a feature of the Diamond Jubilee Progress Year now being celebrated by PTI. The keynote speech was delivered by Bertrand W Hayward, PTI president, and Postmaster Frederic H Barth made the presentation. Everett L Kent served as dinner chairman, and W Lyle Holmes, president of Archibald Holmes and Son and chairman of the PTI board of trustees, acted as toastmaster. Albert M Greenfield is chairman of PTI's 75th Anniversary Observance Honorary Committee.

Concluding that strikes like wars no longer serve their original purposes, Kelly cautioned that we are now playing into Premier Krushchev's hands. He said, "At our present rate we are headed for inflation, and more civilizations have failed on account of inflation than have been conquered on a battlefield."

Citing the costly steel strike as an example, the loss in wages alone in this and many other lengthy strikes will never be made up."

"Therefore", he continued, "Congress should pass a law outlawing all strikes, wildcat or otherwise, and create a supreme court of labor composed of two representatives of labor, two of industry, two representing the public and a seventh, either elected by the people or appointed by the President".

"This court would handle all major industry. District courts would be established throughout the country to handle local cases. In other words, the labor courts would operate in the same manner as our present legal courts."

Kelly said he foresees the breakdown of American economy unless something is done along this line. He added that the public suffers to a much greater degree from strikes than the employees and strikers.

Dr Hayward, in his address, reviewed the status, progress and problems of PTI relating to general problems in education. Regarding closed college doors, he reported that his college could double its enrollment immediately. Dr Hayward stated that American institutions of higher learning must meet the challenge of Russian education and increase the salaries of our professors. The PTI president stressed that the textile school is equipped to lead in the re-evaluation and revamping of our educational system to avoid obsolesence in education.

The Kelly tribute was a highlight of PTI's $150,000 Diamond Jubilee Progress Fund drive. The campaign seeks funds to improve educational and research facilities and to expand facilities at PTI.

Acrylic advantages boost fabric quality

Off the loop dryers it comes . . . superlatively fine fabric with the Fort-i-Fide finish which RHOPLEX acrylic resin helps to give. (Photographed at Old Fort, N. C. plant of United Merchants and Manufacturers, Inc.)

Makers of quality fabrics—United Merchants and Manufacturers, for example—use RHOPLEX for many purposes because RHOPLEX adds value to fabrics in many ways.

For instance, giving to wash-wear finishes their sensationally improved physical properties and to cotton or rayon piece goods the exact hand or drape they should have. Adding durability, abrasion-resistance, and delustering are other quality-boosting ways to use RHOPLEX resins.

It's easy, too, because you can usually use aqueous, solvent-free dispersions of RHOPLEX acrylic resins without making any major changes in your wet processing procedures. Get a complete description of the many advantages of using RHOPLEX resins in fine fabric finishing by writing to Rohm & Haas, today.
(Fort-i-Fide is a trademark of United Merchants and Manufacturers, Inc.)

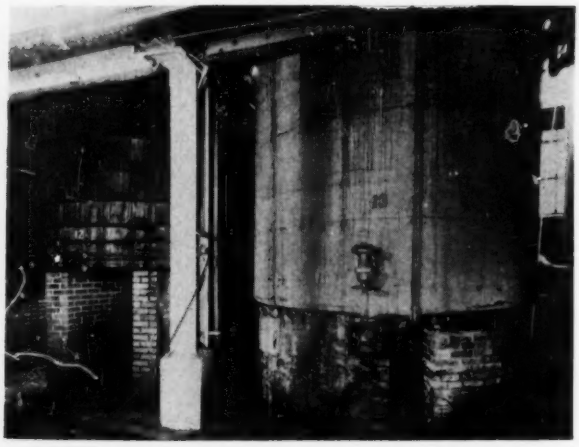
Chemicals for Industry

ROHM & HAAS COMPANY

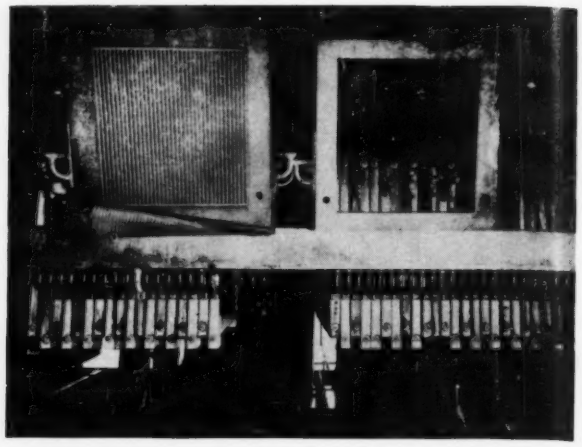
WASHINGTON SQUARE, PHILADELPHIA 5, PA.

RHOPLEX *is a trademark, Reg. U.S. Pat. Off. and in principal foreign countries.*

RHOPLEX



The 2500-gallon dyestuff tank on the right has been in use at Althouse Chemical Co, Reading, Pa, for two years with no perceptible wear. The wooden tank on the left is about to be replaced with another polyester tank.



Dyestuff filter press with polyester filter frames in use at Althouse Chemical Co. Water is filtered from liquid dyes. Semiliquid dye is then scraped from the filters, oven dried, powdered and packaged for shipment.

Molded Plastic Tanks Replacing Others in Processing Althouse Dyestuffs

Althouse Chemical Co, Reading, Pa, is replacing wood with molded plastics for its tanks, filter presses, trucks and other equipment "because the plastics are lighter, cheaper and have longer longevity", it is reported.

At Althouse, Otto Putnam, plant manager, began experimenting with a 2,500-gallon polyester tank about two years ago to replace wood and has since added others. The initial cost was higher than wood, but inasmuch as the plastic has an estimated life-expectancy of 15 years as compared to five for wood, this reportedly was of incidental consideration. Stainless-steel tanks were bypassed by Althouse as "too expensive."

Advantages accruing to Althouse have been cited as follows:

"Whereas contamination was a problem with wooden tanks, no contamination has resulted from two years use of the plastic tank. The wooden tanks often leaked and were difficult to clean. Once cleaned they had to be refilled with water in the interim between cleaning and reuse for mixing dyestuffs, so that they would not shrink. On the other hand the plastic tanks can be cleaned instantly and immediately returned to duty. Because of their non-absorbent surface there is no dye penetration to contend with. In operation they are cleaner and require no maintenance."

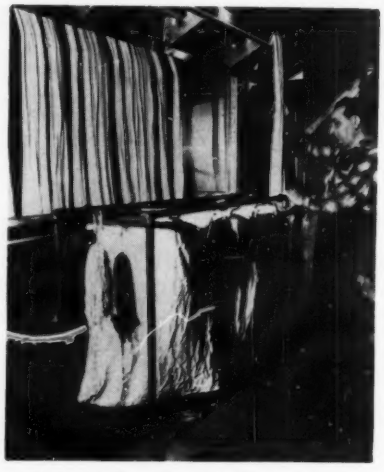
Beetle Plastics of Crompton & Knowles, Fall River, Mass, which built the original tank for Althouse and others, is now manufacturing more. It is stated that the lighter weight of the plastic tank simplifies shipping and installation costs. While weight is no real factor once the tank is in use—the weight of the contents being so much greater proportionally whether the tank is of plastic, wood or metal—the problem of installation is said to be less inasmuch as the plastic tank can be handled by light crane or with the aid of a few men.

Filter press frames made of the same polyester plastics have replaced wooden filter presses at Althouse. Althouse stated that, after a time, the wooden frames became moisture impregnated and warped unless kept wet. They also were heavier, and fewer could be packed into the press, thereby slowing work. The new plastic filters are claimed to be tougher, lighter and thinner than wood. Althouse's trucks, which haul pulped dyestuff from the filter presses to the drying ovens, are now made entirely of plastic. It is stated that, beyond having the advantage of being lighter to manipulate, they are easier to clean. They also have curved inner surfaces, which make it easier to shovel from.

•

Coronet Using Dye Reel Covers of Dynel

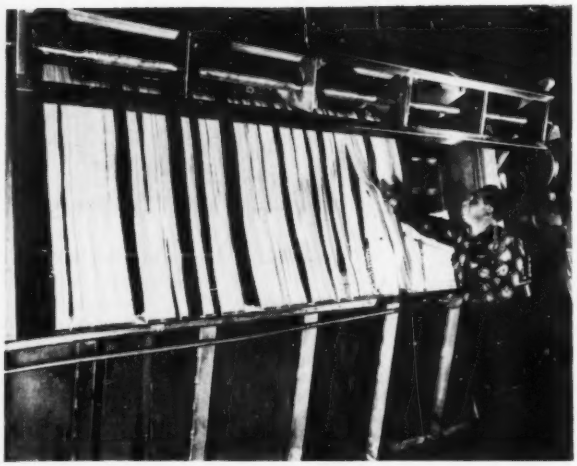
Substantial economies in material and maintenance costs in standard dyeing operations through use of dye reel covers and extractor bags of Dynel fabric are reported by Coronet Piece Dye Works Inc, Elmhurst, NY. Coronet, which dyes all types of tubular knit goods, including cottons, woolens and synthetics on a production basis, is using fabric woven of Dynel modacrylic fiber to cover the stainless-steel overhead winch reels in each of its 10-foot dye boxes. The covers are designed to protect knit fabrics while they are being dyed.



Coronet Piece Dye Works, Inc employs Dynel for its extraction bags used to hold each piece after dyeing.

The 100% Dynel 12-ounce fabric, woven of Union Carbide Corp's modacrylic fiber by U S Rubber Co, reportedly stands up exceptionally well to the unusually heavy abrasion received in the process. According to Charles Schoenrock, plant manager at Coronet, the average life of a Dynel cover is six months or better compared to about 30 days for heavy duck cloth previously used for the purpose. Although the Dynel fabric is three times the cost of the cotton cloth, its life-to-cost ratio is at least double, he points out.

Even more important from the dyer's view are the savings reported in production costs and man hours by eliminating the job of frequently replacing the 100-square-foot reel covers. It is stated that every change means a half-day shutdown for the



Overhead winch reels in 10-foot dye boxes, such as the one pictured above, are provided with Dynel cover at Coronet Piece Dye Works, Inc, Elmhurst, NY

Woman's Orlon 21 sweater from Boepple Sportswear Mills, Inc; Man's sweater from Puritan Sportswear Corp

dye box, each of which holds a dye run of from 400 to 700 pounds of goods at a time.

In addition to Dynel's high abrasion factor, it is also inherently inert to acids and other chemicals. Thus, it is pointed out, sodium hypochlorite used in washing the reels and sodium chlorite used in bleaching of synthetics have no effect on the Dynel cover's strength. Also it is said to be unaffected by many types of dyes or coloring materials at the temperatures used, thereby eliminating many problems in changing from one color to another in dye-lots; eg, in dyeing rayon or cotton goods, the colors do not affect the Dynel reel covers and stripping is not necessary.

Coronet has been testing Dynel covers for several years and recently began to employ them on all of its reels.

The plant also uses Dynel bags to hold dyed pieces in the extractor. Dynel's strength and abrasion resistance is said to give longer life for the bags, used to keep the pieces separated, clean, and prevent possible bleeding or crocking.

Further information on this and other applications of Dynel industrial fabrics may be obtained from the Textile Fibers Department, Union Carbide Chemicals Co, Division of Union Carbide Corp, 100 East 42nd Street, New York, 17, NY.

•

Orlon 21 Acrylic Fiber

Du Pont recently began production of a new form of Orlon acrylic fiber with an important characteristic which reportedly has never before been achieved in a synthetic fiber—reversible crimp.

The new fiber supplements, but does not replace, other types of Orlon. Called Orlon 21, the new acrylic fiber is said to introduce greater elasticity and shape-holding qualities in women's and men's sweaters and in hand knitting yarns—the uses in which it is first appearing.

Evaluation of the fiber in woven goods, while not yet complete, reportedly indicates its important contribution in this field.

According to DuPont, the reversible crimp of Orlon 21 gives a "liveliness" to the fabric which renews the garment's appearance with every washing or drycleaning. The energy of the recrimping action, as the garment dries, literally "works" the fabric surface to restore its original, unmussed appearance, it is claimed.

"Prior to the appearance of Orlon 21, fiber crimp was put into manmade fibers by mechanical means, principally by deforming the fibers under pressure while hot," according to Kenneth C Bass Jr, Du Pont merchandising manager for women's outerwear.

"But Orlon 21 is different," he continued. "The crimp is not mechanical; it is a permanent attribute of the fiber. As a result, it persists through the manufacturer's hot dyebath as well as repeated washings at home. It is manifest in the garments' performance.

"Orlon 21 exhibits all the characteristics of excellent dyeability, comfort, washability and lack of appeal for moths that gained the parent fiber its present position," Mr Bass emphasized. It will be produced in Du Pont's Camden, SC, plant. Presently available in three- and six-denier staple form only, a tow form is under development and is expected to be available later. It is priced at $1.53 a pound, which compares with a price range of 94 cents to $1.28 for other types of Orlon acrylic fiber.

•

Users Reporting on Appearance, Washfastness of Procinyl Dyestuffs

Reactions of customers to the new Procinyl fiber-reactive disperse dyestuffs are reported by Arnold, Hoffman & Co, Inc as indicating considerable interest in their use for production of washfast shades on nylon.

In one instance, according to Arnold, Hoffman, bulk trials under controlled conditions have been carried out on nylon uniform fabric to produce a pale shade of blue. Separate dyeings were made with Procinyls and with conventional disperse dyestuffs, the latter acting as a control for comparison purposes. Findings reported to Arnold, Hoffman were that the Procinyl dyes produced substantially better washfastness; and consensus of opinion was that the Procinyl dyeing proved superior in general levelness and appearance to the dyeing produced with regular disperse dyestuffs.

Current Procinyl range, recently introduced to the U S market by Arnold, Hoffman, includes Yellow GS, Orange GS, Scarlet GS and Blue RS. The new fiber-reactive disperse dyes for nylon were originated by the research laboratories of Imperial Chemical Industries, Ltd, which a few years ago developed Procion fiber-reactive dyes.

• NAMES IN THE NEWS •

Ferguson

John G Ferguson will represent Putnam Chemical Corp in the Mid-Atlantic area, with headquarters in Putnam's Philadelphia office.

Before joining Putnam, Mr Ferguson was superintendent of dyeing with Swan Finishing Corp.

•

Douglas K Ridley has been appointed by Minneapolis-Honeywell Regulator Co to a new post as contract sales manager for automatic control equipment produced by its Philadelphia-based Brown Instruments Division and other Industrial Products Group units.

He will be responsible for contract operations embracing installation and servicing of industrial instrumentation systems designed and developed by Honeywell.

Ridley joined Honeywell's Commercial Division in 1947. He served as regional sales manager in Dallas and Chicago prior to his present assignment.

•

The appointment of five regional vice presidents for the new and reorganized Corn Products Sales Division of Corn Products Company was announced recently.

The regional vice presidents will report to *Harold Plimpton Jr*, vice president and general manager of the division. They include *Harold V P Francis* and *Michael D Mullin* in the eastern region with headquarters in New York; *Tim C Clawson* in the central region with headquarters in Chicago; *Fred C Hassman Jr* in the southern region with headquarters in Memphis; and *James E Walz* in the western region with headquarters in San Francisco.

The Corn Products Sales Division will be responsible for the sales and merchandising of all industrial products, including those previously handled by the company's Best Foods Division.

Corn Products Company's line of consumer products will become the responsibility of the new Best Foods Division.

Robert O Young, a forecaster in GAF's Control Department, receives congratulations, a savings bond and 50-year pin at Golden Anniversary Party from Francis Charles, Linden, NJ, plant manager

Robert O Young, a forecaster in the Control Department of General Aniline & Film Corporation's Dyestuff and Chemical Division plant at Linden, NJ, celebrated his golden anniversary with the company last month.

An event which is likely to happen less and less frequently these days, with modern-day requirements in juvenile work laws and compulsory retirement at 65, this event was duly recognized at the company.

A party was given in honor of Mr Young and his wife at the Mayfair Farms, West Orange, NJ, where he was presented with a savings bond by *Harold G Shelton*, general mgr of the Division. *Bradley T Lord* gave Mr Young a specially made 50-year service tie-bar as a reminder of the occasion.

The party was also attended by four General Aniline employees with a 40-year record of service, and their wives: *Mr & Mrs Jackson Ayo, Mr & Mrs Ernest Kuhn, Mr & Mrs Max Levy*, and *Mr & Mrs Michael Zetkulic*.

Mr Young, a native of Jersey City, NJ, born in 1894, started at $4.00 a week in September, 1909 as an office boy in Linden with Farbenfabriken Elberfeld Co, which became Bayer Company in 1912, Grasselli Chemical Co in 1919 and General Dyestuff Corp in 1926.

Besides Mr Young and the four 40-year employees and wives, other guests attending were: *Dr & Mrs Chris C Schulze*, asst genl mgr; *Mr & Mrs Francis Charles*, Linden plant mgr; *Dr & Mrs Bradley T Lord*, Linden control mgr; *Mr & Mrs Ernest Tesch*, supr sales service, and *Mr & Mrs Proctor Smith*, supr of benefits and services.

Buonanno

Metro-Atlantic, Inc, Centredale, RI, has announced the appointment of *Joseph E Buonanno Jr* to the sales and technical staff.

Mr Buonanno, who will work out of Centredale, will service certain phases of the textile business, but will devote most of his time to the growth and development of Metro-Atlantic's paper division. He gained his basic experience in the Metro-Atlantic research and sales-service laboratories and has spent some time in sales and sales-service in the field.

•

The $300 Carolina Yarn Association Scholarship has been awarded to *Gene Erwin Inman*, junior in the School of Textiles at North Carolina State College.

•

Dulin

Ranson

Southern Dyestuff Co, division of American Marietta Co, has announced the following personnel changes, which became effective Dec 1:

C Jordan Dulin, formerly assistant director of sales, has been promoted to director of sales. He will be responsible for the entire domestic sales operation of the company.

R Query Ranson, formerly dyestuff product manager, is now sales and product manager.

David F Mason has moved up from director of research and development to the post of technical manager.

Thomas E Lesslie, formerly chief research chemist, is now director of research.

Cameron Faison, formerly office manager, has moved up to sales office manager and assistant to the director of sales.

Bela A Silard has been elected president of Photovolt Corp, New York manufacturers of photoelectric and electronic measuring instruments. He succeeds to the office that became vacant by the recent death of *Fritz Lonberg*, founder of the firm. Dr Silard has been associated with the Corporation for 20 years as vice president.

Curt Lonberg has been elected to the newly created office of executive vice president, having served as treasurer of the Corporation for 19 years.

Semyon E Krewer, director of research, also associated with the firm for almost 20 years, was elected vice president.

David Friedmann, advertising manager and assistant sales manager, was elected assistant vice president.

●

Lucius Collins, for the last seven years manager of the dyes and auxiliaries sales development section of Du Pont's Dyes and Chemicals Division, has been appointed manager of the division's New York consulting service for the dyeing and finishing trade.

As manager of the consulting service, Mr Collins succeeds *Samuel A Pettus*, who resigned from the Du Pont Co on December 1.

Mr Collins has moved from Wilmington to New York.

●

The Silicone Products Dept, General Electric Co has announced the following recent personnel moves:

Thomas S Moroney has been appointed sales representative for the Cleveland district (Michigan territory), with offices at 211 Woodward Ave, Detroit 1, Mich. Mr Moroney, who joined G-E in August, succeeds *R A Steerod*, who recently joined Monsanto Chemical Co.

Thomas H Reilly succeeds *William Connell* as sales representative for the New England district, with offices at 145 North Beacon St, Boston, Mass. Mr Reilly served most recently as marketing research and product planning specialist for G-E silicone products with headquarters in Waterford, NY. Mr Connell has joined the Trancoa Chemical Co of Reading, Mass.

Ted A Venia succeeds *W L Batty* as sales representative for the Eastern district, with offices at 1285 Boston Ave, Bridgeport, Conn. Mr Venia was formerly a sales representative in the Silicone Products Department's Western district, with offices in Dallas, Texas. Mr Batty has been appointed a specialist in rubber market development at Waterford, NY.

Elden

Braun

Two promotions at the Vancouver, Wash, plant of the Becco Chemical Div, Food Machinery and Chemical Corp, have been announced.

Richard E Elden has been promoted to resident manager and *Richard F Braun* has been appointed to succeed him as production manager.

Mr Elden has served since 1956 as production manager. Mr Braun has been with Becco in Vancouver since 1957, when he joined the company as production superintendent.

●

Okey

As previously noted, *Joseph A Okey* of Graham Chemical Co will serve as a Southern representative of Eastern Color & Chemical Co, Providence, RI, from his home office in Graham, NC.

●

Scaccia

At a recent meeting of the board of directors of the Arkansas Company, Inc, Newark, NJ, *Albert N Scaccia* was elected vice president of the company to fill the vacancy left by the death of *Charles L Schuttig*.

Mr Scaccia has been associated with the Arkansas Company for 28 years and for the past 10 years has been in charge of manufacturing and production. He will continue in this capacity together with his responsibilities as a director of the company.

Formation of the Southeastern Sales Division was recently announced by Union Carbide Chemicals Co, division of Union Carbide Corp. The new division includes all of the Atlantic coast from Florida to New Jersey, and extends westward through Pennsylvania to parts of Ohio, Kentucky, and West Virginia.

Richard J Hughes has been named Southeastern Division sales manager, with headquarters in Moorestown, NJ. He has served as district manager of the Delaware Valley district office since 1956.

George S Cooper, formerly assistant district manager of the New York sales office, succeeds Mr Hughes as district manager of the Delaware Valley district, and *Richard S Butler*, formerly located in the St Louis and Tulsa offices has been named assistant district manager of the Delaware Valley district.

Ralph F Gildehaus, formerly located in the Charlotte, NC and Delaware Valley district offices as a technical representative, assumes new responsibilities as a technical representative in the Tulsa district office.

Paul A Hiznay has been named technical representative in the Delaware Valley district.

Several appointments at the Technical Service Laboratory, Tarrytown, NY, were recently announced by Union Carbide Chemicals Company. They are: *Howard D Cogan and Charles E Colwell*, research supervisors; *John H Fager*, head, Department of Analytical Chemistry; and *Charles W West*, head, Department of Physical Chemistry. In their new positions, they will be responsible for directing and coordinating certain of the use-research and customer service programs. All four men are Industrial Fellows on the Organic Synthesis Fellowship at Mellon Institute.

Appointment of *Buelah Wood* as librarian of the Technical Service Laboratory was also announced. Prior to her new assignment, Miss Wood was librarian in Carbide's Marketing Information Center.

●

Duane H Eckdahl has joined the Organic Chemicals Department of Food Machinery and Chemical Corporation as administrative assistant to *A T Loeffler*, department manager and FMC vice president. This FMC Department is made up of the Chemicals & Plastics and Niagara Chemical Divisions.

Before joining FMC, Mr Eckdahl was associated with Shell Chemical Corp. His most recent assignment with Shell was as market analyst.

PENETRANTS • DETERGENTS • SOFTENERS • REPELLENTS • FINISHES

BURK-SCHIER

BURKART-SCHIER CHEMICAL CO., CHATTANOOGA, TENN.

CLASSIFIED ADVERTISEMENTS

Advertisements in this section are restricted to HELP WANTED — POSITION WANTED — EQUIPMENT wanted or for sale. Rates, effective February 1, 1951; One-time, $14.00 per column inch; 13 or more times, $12.00 per column inch: Position Wanted, $4.00 per column inch. Figure 38 average words per column inch. Publisher reserves the right to reject or discontinue any classified advertisement. Replies should be addressed: Box Number ..... c/o American Dyestuff Reporter, 44 East 23rd Street, New York 10, N. Y.

• *SERVICES* •

ABSTRACTING SERVICES—Abstracting and digesting of foreign patents and periodicals. Literature review and special reports in dyestuffs and cellulose chemistry. PAUL WENGRAF, 88-36 ELMHURST AVENUE, ELMHURST 73, NEW YORK.

TEXTILE MEN OUR SPECIALTY
Over 55 Years in Business
THE EXECUTIVE YOU NEED may be listed with us. Employers find our Service helpful and time saving. Your phone call, wire or letter will bring prompt attention.
CHARLES P. RAYMOND SERVICE., INC.
Phone: LIberty 2-6547
294 Washington St. Boston 8, Mass.

• *OPPORTUNITIES AVAILABLE* •

WANTED: TEXTILE CHEMIST or DYER AND FINISHER—A challenging opportunity in the area of developing new and improved dyeing and finishing is presently available in our Textile Research Laboratories for a Textile Chemist or Dyer and Finisher. A minimum of 2 to 3 years experience in practical dye house operations coupled with at least a B.S. in Chemistry or the equivalent is required. Experience should include dyeing of synthetic fiber and blends of synthetic fibers. Salary commensurate with experience and training. Send resume to: Manager, Employment-Recruitment, The Chemstrand Corporation Box AR-2 Decatur, Alabama.

WANTED: ANALYTICAL CHEMIST—Position requires person experienced in analyzing textile specialties. Plants in New England and the South. Excellent opportunity in old established and growing New England textile specialty manufacturing concern. Desires man to work in New England. Experienced in analyzing textile finishing materials of all types. Salary commensurate with background and ability. Replies held confidential. Write Box No. 846

WANTED: FOREMAN DYER. Approximately 100,000 yards plain shades and 300,000 yards print dyed styles per week. All cotton. Two hot flues and one continuous napthol dyeing machine. No jig or kettle dyeing. New York metropolitan area. Send complete resume and salary expectations. Write Box No. 847

WANTED: DYER—must be thoroughly experienced in beck dyeing of piece goods containing blends of Viscose, Acetate, Nylon, Dacron. All correspondence will be kept strictly confidential. Write Box No. 848.

WANTED: Basic manufacturer of special type caustic and acid-soluble surface active agents and additives for textile processing has selling opportunity available for agents calling on this market. Attractive commission. Please advise territory now covered and lines handled at present. Write Box No. 849

WANTED: CHEMIST—With degree and two or more years experience in bleaching and dyeing. Need man to handle special development problems in large nationally known knitwear plant located in Georgia. Salary open. Attractive fringe benefits. Write Box No. 852.

• *PERSONNEL AVAILABLE* •

POSITION WANTED: Age 27, experienced in technical sales, production, and application of dyes and finishes. B. S. in chemistry and dyeing, active service completed. Interested in sales, technical service or dyeing. Write Box No. 834

POSITION WANTED: TEXTILE CHEMIST with eight years experience in various phases of textile finishing would like a position in research and development of the tufted carpet industry or basic carpet fiber manufacturer. Southeast area preferred. Write Box No. 840

TEXTILE CHEMISTS

We are seeking experienced Chemists with textile background, for immediate openings in Dyestuffs Application Research. The positions offer growth potential with a variety of non-routine problems. The work is challenging and interesting, performed in a creative atmosphere in a new, modern research center located in Buffalo, a city with many cultural and recreational advantages.

You may send your resume in confidence to:

M. W. Mead, Research & Development Dept.

NATIONAL ANILINE DIVISION
ALLIED CHEMICAL CORP.
P. O. Box 975, BUFFALO 5, N. Y.

Allied Chemical

• *PERSONNEL AVAILABLE* •

POSITION WANTED: Graduate Textile Engineer with good knowledge of Chemistry. Specialized in modern Dyeing and Finishing of all natural and synthetic fibers. Good working knowledge of Thermosetting resins with over a year of plant experience in moulding. Many years of experience in color matching, dyeing and supervising; planning and organizing. Fluent English and Russian with some knowledge of French and German. Canadian. Will locate in, or near a large city. Write Box No. 853

Give

to

the

AMERICAN

CANCER

SOCIETY

• INDEX TO ADVERTISERS •

Alliance Chemical Corp.
Allied Chemical Corp.
National Aniline Division ... 22, 59
Solvay Process Division
Althouse Chemical Co. ... 13
American Cyanamid Co.
Antara Chemicals Div., General Aniline & Film Corp. ... 5
Ansbacher-Siegle Corporation
Apex Chemical Co., Inc.
Arkansas Company, Inc. ... 19
Arnold, Hoffman & Co., Inc. ... 7
Atlantic Chemical Corp.
Atlantic Refining Co., The
Atlas Electric Devices Co.

Becco Chemical Division
Food Machinery & Chemical Corp.
Belle Chemical Co., Inc.
Berkshire Color and Chemical Co.
Burkart-Schier Chemical Co. ... 58

Calgon Company
Campbell & Co., Inc., John
Carbic-Hoechst Corp.
Catalin Corporation of America
Chemical Products Corp.
Ciba Company, Inc. ... 10, 11
Colgate-Palmolive Company
Crown Chemical Corp.

De Paul Chemical Co., Inc.
Dexter Chemical Corp. ... 14
Diamond Crystal Salt Co.
Dow Corning Corp.
Drew & Co., Inc., E. F.
Du Pont de Nemours & Co., (Inc.) E. I.
Dyes and Chemicals Division
Electrochemicals Dept.

Eastman Chemical Products, Inc.
Emkay Chemical Co.

Fablock Mills, Inc.
W. F. Fancourt Co. ... Third Cover
Farbwerke Hoechst, A. G.
Feeley Co., E. J.
Food Machinery & Chemical Corp.
Foxboro Co., The

Gabb Special Products, Inc.
Gaston County Dyeing Machine Co.
Geigy Dyestuffs
Division of Geigy Chemical Corporation ... 20
General Aniline & Film Corp. ... 5
General Dyestuff Company ... 5
Goodrich Chemical Company, B. F. ... 4
Goodyear Chemical Division ... 9

Hagan Chemicals and Controls, Inc.
Harshaw Chemical Co., The ... 16
Hart Products Corporation, The ... 15
Hercules Powder Company
Hilton-Davis Chemical Co., Division ... 3
Hoechst Chemical Corp.
Howes Publishing Company ... 18

The Laurel Leaf

BUSINESS MAGAZINE EDITION

Which of these LAUREL TEXTILE SPECIALTIES will help you cut your processing costs?

- ☐ Soaps—all titres—prepared to highest standards for every textile need—fulling, scouring and finishing. Raw stock, woolen and worsted goods. Scouring and dyeing all synthetic fibers. Soaping vat-dyed cotton yarns and piece goods.
- ☐ Olapon—a series of synthetic compounds for scouring and dyeing all natural and synthetic fibers.
- ☐ Hydrosol—cresylic acid scouring and kier assistants. Especially good for use on wool and cotton.
- ☐ Mercerizing Penetrants—a series of cresylic acid type penetrants for use with all strengths of caustic soda up to 80° Tw. Non-cresylic types are also available.
- ☐ Laurel Transfer Removers—a line of products for all types of transfers to be applied by either wet or dry processing.
- ☐ Boil-Off Compounds—Boil-off oils, Triconate boil-off powders, Supersulfate neutral boil-off powders.
- ☐ Amine Condensates—straight and compounded to suit your requirements.
- ☐ Alkyl Aryl Sulfonates—Liquid, paste, and powder. Neutral or built for all purposes. Amine or sodium salts available.
- ☐ Sulfated Esters—for wetting, dyeing, rewetting. Preshrinking assistant.
- ☐ Lauramine 20—superior packaged dyed yarn lubricant and softener. Does not yellow whites or alter shades.
- ☐ Lauramine 20A—A liquid form of Lauramine 20. Predispersed for simplified use.
- ☐ Catamine SF—excellent cationic softener for natural and synthetic fibers. Easily dispersed. Particularly effective on Orlon and wool knitted fabrics.
- ☐ Sulfonated Oils—tallow, castor, olive, neatsfoot. Available straight or compounded for special finishing problems.
- ☐ Flame Retardants—a series of renewable type products to cover all requirements on cotton fabrics
- ☐ Water Repellents—renewable type.
- ☐ Sizes—Resin and gelatine sizing and finishing compounds for all fibers and fabrics.
- ☐ Hydrocop & 3B Softener—Wax Emulsion WG, Wax Emulsion R, Ruxite A—for softening, conditioning, and lubricating all natural and spun synthetic yarns for knitting.
- ☐ Coning Oils—for all synthetic yarns—filament and spun.
- ☐ Hosiery Finishes—a complete line of resin hosiery finishes.
- ☐ Dullers, Weighters and Conditioners—a full line to meet your requirements.
- ☐ Antifoams—quick, easy-to-use. Readily dispersed; stable.
- ☐ Antistatic Compounds—non permanent types for all fibers.

Check your needs . . . then tear out and mail this advertisement for complete details.

Laurel Brand — 50 YEARS OF SERVICE TO INDUSTRY 1909-1959

Laurel SOAP MANUFACTURING CO., INC.

TIOGA, THOMPSON & ALMOND STS., PHILA. 34, PA.

Warehouses: Paterson, N. J. Chattanooga, Tenn. Charlotte, N. C. Greenville, S. C.

INDEX TO ADVERTISERS

Imperial Color Chem. & Paper Corp.	
Instrument Development Laboratories, Inc.	
Interchemical Corp., Color & Chemicals Division	
International Salt Co., Inc.	
Klauder Weldon Giles Machine Co.	
Kragmar, Inc.	
Laurel Soap Manufacturing Co.	60
Leatex Chemical Co.	
Lestoil, Inc.	
Manufacturers Chemicals Company, Inc.	
Metalsmiths Div., Orange Roller Bearing Co., Inc.	
Mettler Instrument Corporation	
Monsanto Chemical Company	6
Moretex Chemical Products, Inc.	
Morton Salt Co.	
National Aniline Division, Allied Chemical Corp.	22, 59
National Starch and Chemical Corporation	
Nopco Chemical Company	
Nyanza Color & Chemical Co., Inc.	
Obermaier & Cie	
Onyx Oil and Chemical Company	
Organic Chemical Corporation	
Pabst Brewing Co.	
Peerless Color Company, Inc.	
Philadelphia Quartz Co.	
Photovolt Corp.	
Polymer Industries, Inc.	
Polyvinyl Chemicals, Inc.	
Procter & Gamble Co.	
Putnam Chemical Co.	
Rohm & Haas Co.	53
Royce Chemical Company	Fourth Cover
Rumford Chemical Works	
Reading Scientific Company	
Refined Products Corp.	
Riggs & Lombard, Inc.	
Sandoz, Inc.	17, 51
Scholler Bros., Inc.	
Seydel-Woolley & Co.	
Solvay Process Division, Allied Chemical Corp.	
Sou-Tex, Inc.	
Southern Dyestuff Company	
Standard Chemical Products, Inc.	8
Sun Chemical Company	12
Synthetic Chemicals, Inc.	
Tanatex Chemical Corp.	Second Cover
Taylor Instrument Companies	
Tex-Chem Co.	
Union Carbide Chemicals Company	
Verona Dyestuffs	
Wallerstein Company	
Warwick Chemical Division	12
Wica Chemicals, Inc.	Front Cover
Wolf & Co., Jacques	
Wyandotte Chemicals	
Young Aniline Works, Inc.	
Zinsser Division Harshaw Chemical Co.	

THE PROCESSIN'
IS EASY WITH

Reslon-D

the new hosiery resin for belt dryers,
tray dryers and regular
boarding operations

RESLON-D . . . eliminates sticking, permits processing and pairing of hosiery immediately after removal from the dryer.

RESLON-D . . . stops wrinkling and imparts weighty body.

RESLON-D . . . is easy to apply and compatible with other finishes.

RESLON-D . . . gives a wide range of hand.

W. F. FANCOURT CO.

518 SOUTH DELAWARE AVE., PHILADELPHIA 47, PA.

SOLVING FINISHING PROBLEMS SINCE 1904

Southern Office: 309 E. Davis St., Burlington, N. C.; 1412 August Drive, Hixson, Tenn.
Canadian Office: Chemtex Products. Ltd., 49 Densley Ave., Toronto 15, Ont.
Caribbean, Central and South America: A. M. Romero Corp., Empire State Bldg., New York 1, N. Y.
Australia: Paykel Bros., Ltd., 167 Missenden Rd., Newtown, Sydney
New Zealand: Paykel Bros., Ltd., P. O. Box 5046 Auckland, C. 1.

MORE *ACTION*, POUND FOR POUND!

THE REAL COST OF STRIPPING AGENTS CAN ONLY BE CALCULATED BY COMPARING THE AMOUNT OF WORK THEY DO PER DOLLAR OF COST, AND ON THIS BASIS PAROLITE* PRESENTS ONE OF THE BEST BUYS IN THE TEXTILE BUSINESS!

*Normal Zinc-Sulphoxylate Formaldehyde

VERSATILE...PAROLITE will accomplish virtually all of your stripping of wool and synthetics.

EFFICIENT...PAROLITE dissolves quickly leaving no trace of Zinc in the stripped goods which are left soft and in excellent condition for further processing.

STABLE...PAROLITE CAN BE KEPT INDEFINITELY in a minimum of storage space.

SAFE...PAROLITE is easy on personnel—does not irritate skin.

SEND TODAY... for detailed information.

DISCOLITE*
(Sister product to PAROLITE) is unexcelled for discharge and vat printing—keeps its reducing power even when dried into the cloth.
*Sodium Sulphoxylate Formaldehyde

4445

Royce CHEMICAL COMPANY
CARLTON HILL, NEW JERSEY

s
s!

are